



CRP Engagement with Donors Montpellier, 17-18th June 2013

<http://wheat.org/>

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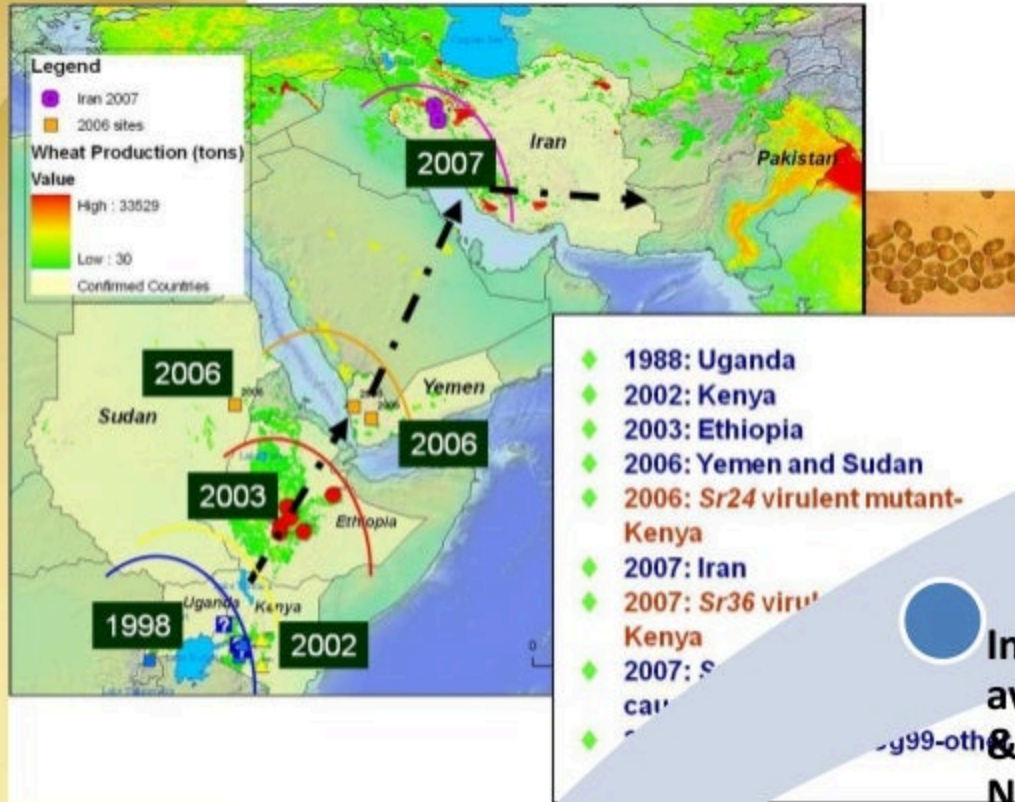


RESEARCH PROGRAM ON
Wheat

Today's Agenda

- **WHEAT IDOs, Impact Pathways & Theories of Change**
 - WHEAT research results and impact on the ground & **Regional collaborations**
 - Gender and Impact
 - Intermediate Development Outcomes & **Flagship Projects**
 - Next Steps to refine IDOs etc. with R4D partners
- **Partnerships**
 - Current status
 - Next steps
- **Conclusions**

Impact pathway in action – Fighting against a threat to global food security (Ug99)



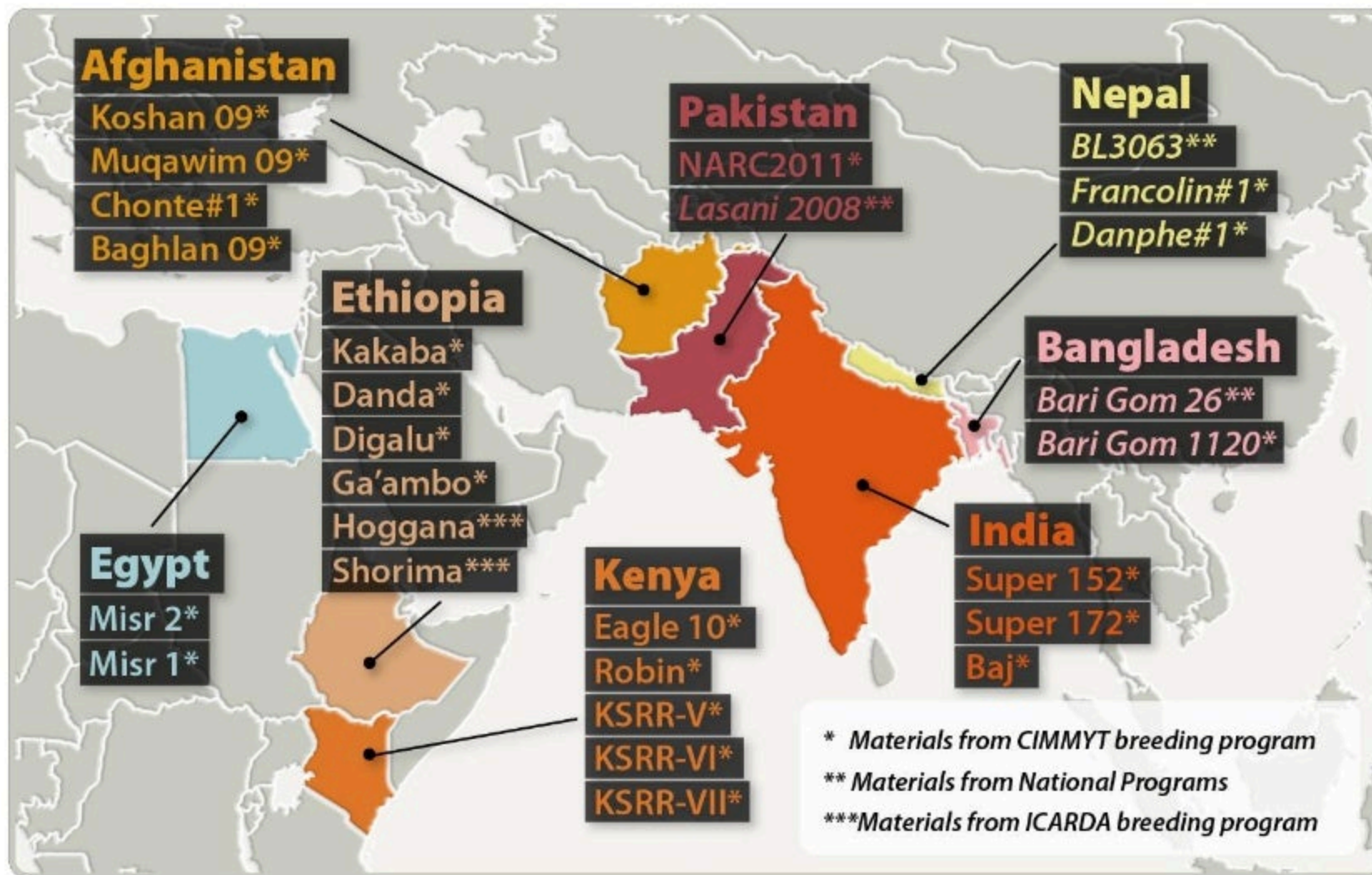
IDO cluster: Improved varieties onto research & farmers fields

**In 5 years from
90% susceptible
varieties to ...**

Improved varieties available to NARS & first releases by NARS

Genetic discovery & breeding for Ug99 resistance (faster thru 2 breeding cycles p.a.)

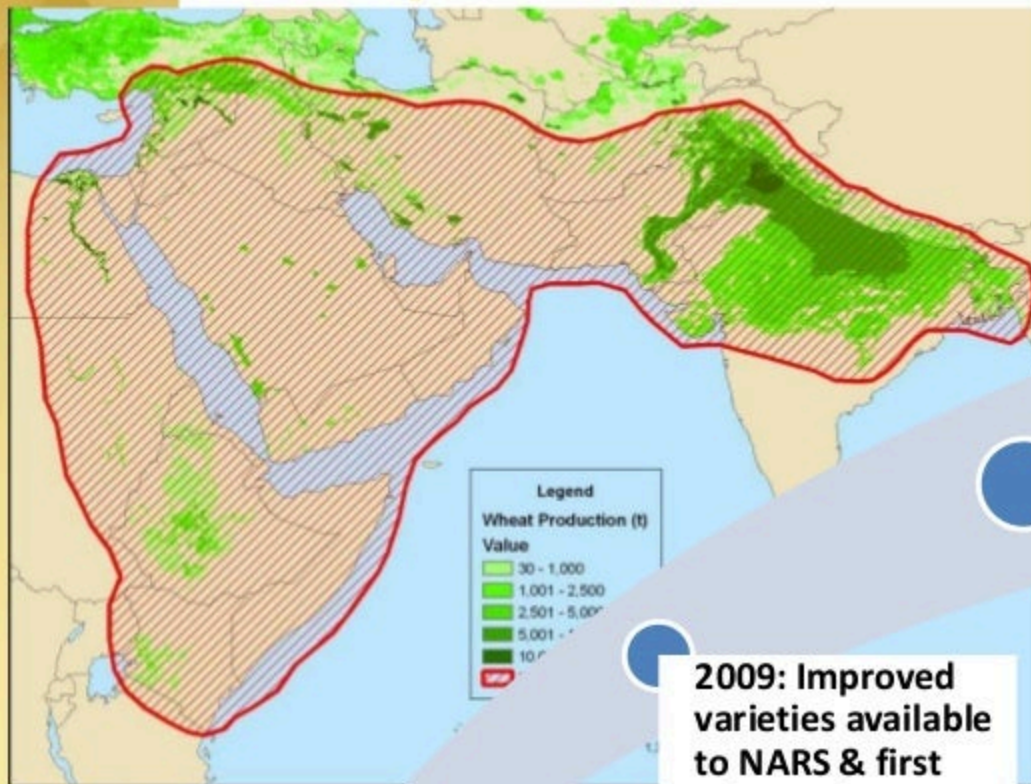
Ug99-resistant wheat varieties released or in advanced tests



More on the Durable Rust Resistance in Wheat project at www.globalrust.org

More varieties expected to be released in 2012

And make 6 countries epidemic-proof: Great example of IAR-NARS-Donors collaboration



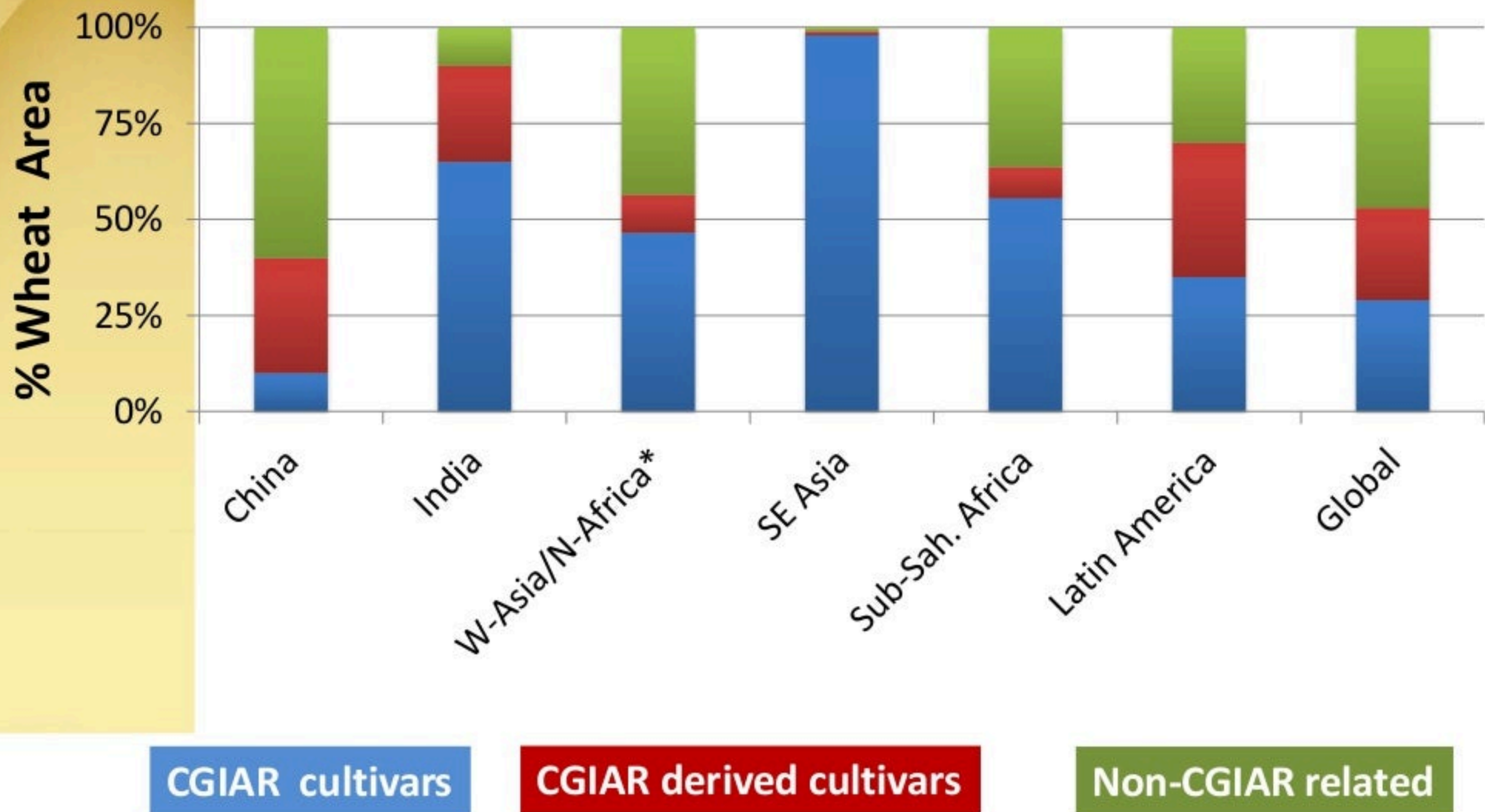
2006-2008:
Genetic discovery
& breeding for
Ug99 resistance
accelerated thru
shuttle breeding
(Mexico - Kenya)

2009: Improved
varieties available
to NARS & first
releases by NARS –
thanks to BGRI

2008-12: Seed
multiplication in 6
vulnerable
countries:
Afghanistan,
Bangladesh,
Egypt, Ethiopia,
Nepal, Pakistan
and Iran – USAID
Famine project,
CGIAR W1&2, Iran

2012-13 season:
5% of national
wheat area
threshold to
counter an
epidemic is
reached

Bigger WHEAT impact picture: Improved varieties in farmers' fields



(Lantican et al., 2005)

Sustainable wheat-based systems

From	To
	String Review Recommendation
Field scale	
NRM	
Protocols /	

IDO: Sustainably grow more with less for improved livelihoods

- Of 15 farming systems in areas of greatest poverty
- 12 are rice-, maize- and/or wheat-based systems
- Drives WHEAT Theme 2 (sustainable wheat-based systems)

CSISA
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199

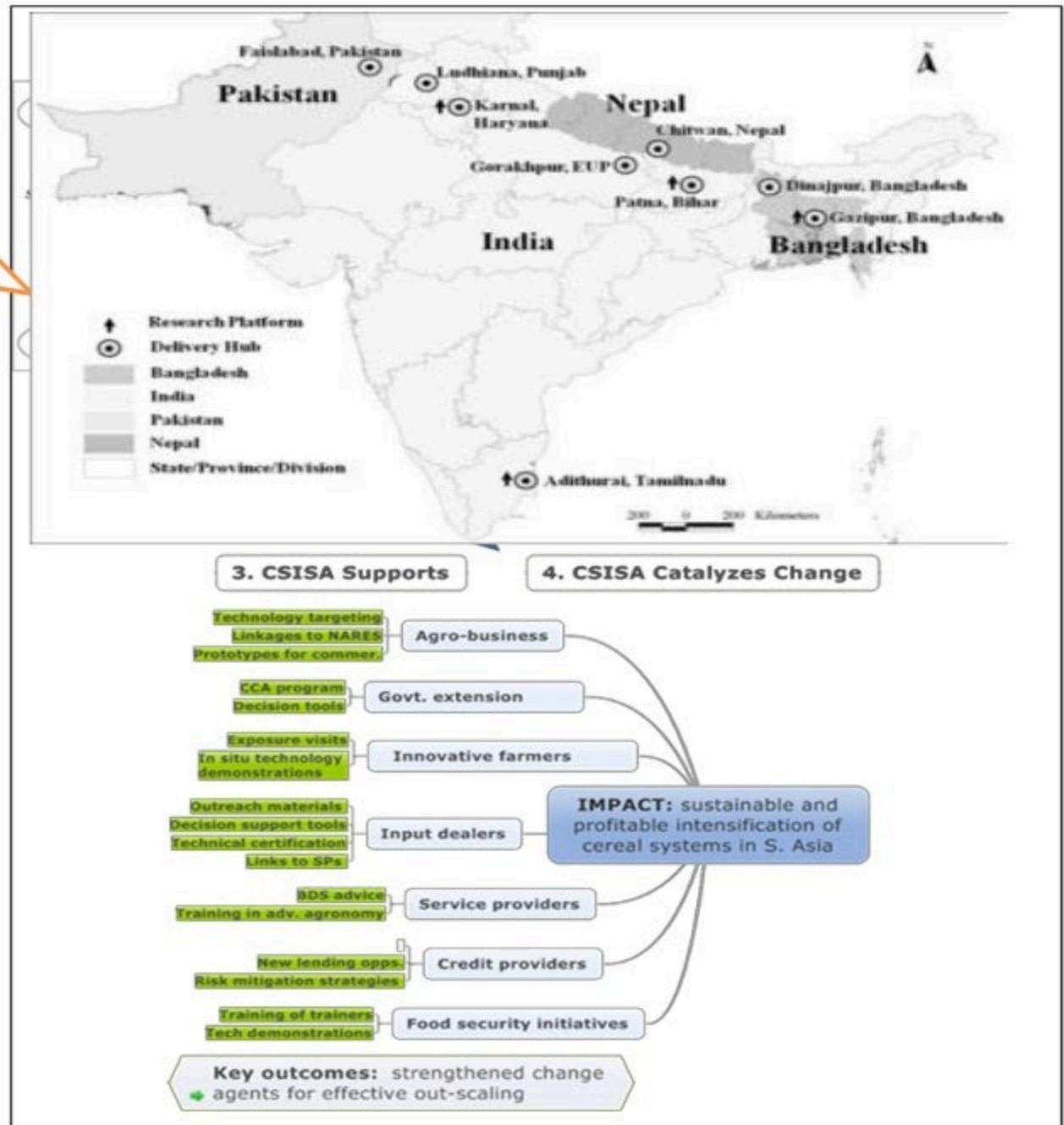
long-term
experiment
starts

Plain: Zero
tillage

learning
platform

WHEAT Regional Collaborations: CSISA as model

Collaboration across CRPs:
WHEAT, GRiSP, MAIZE, Policy, Livestock, CCAFS, in the Indo Gangetic Plain



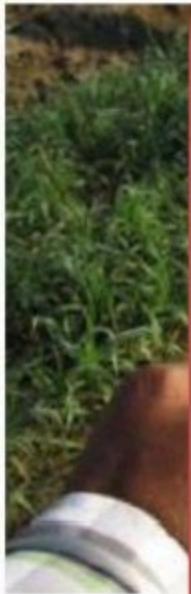
Number of poor in wheat-based systems in South Asia

Cereal systems	>50% area under crop	>25% area under crop
Wheat systems	175 million	284 million
% of total poor (ca. 516mn)	34%	55%

Source: Sonders 2013; based on data from IFPRI, World Bank , FAO, UNDP:
People living on \$1.25 or less a day

Add Precision Ag to the Systems mix

IDO: Sustainably grow more with less for improved livelihoods



- **Wheat uses more N than any other crop (19%)**
- **China, India and Pakistan apply 50% of all N used for wheat**
- **Nitrogen use efficiency in LDC only 1/3 = 2 of 3 kg N applied end up in water or air**
- **NUE in W-Europe is about 65% = twice as high; Max. NUE is around 80%**

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or maize
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Example in Africa: Impact in Ethiopia



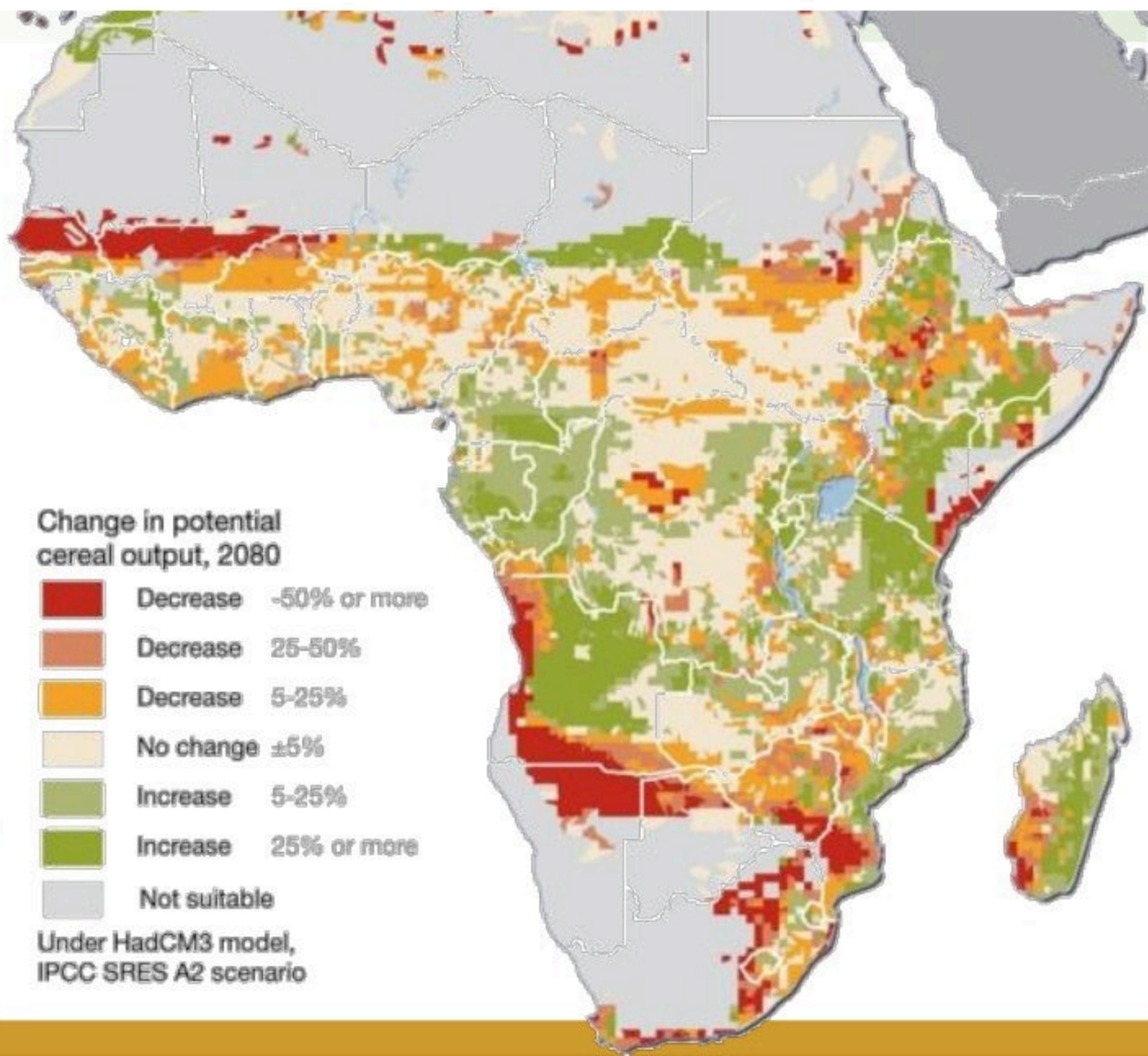
- Improved agronomic/IPM practices
- 122 improved wheat varieties released \geq 80 CGIAR origin /cross
- Yields up from 0.6 t/ha 1970 to 2 t/ha in 2012



What about the rest of Africa?

Wheat for Africa (W4A)!

Climate change brings opportunities to Africa – Changes in cereal outputs

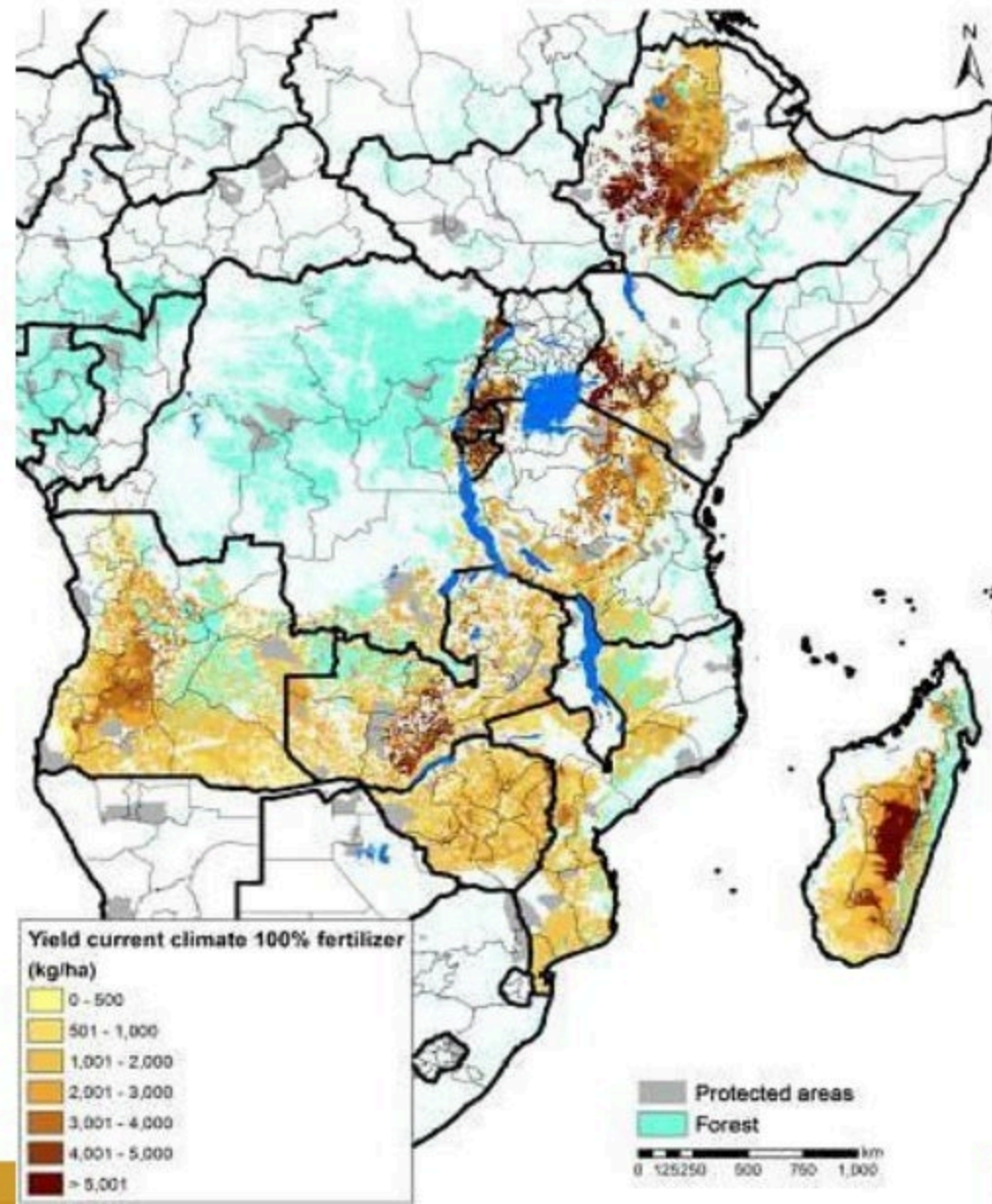


UNEP (2009) The Environmental Food Crisis - The Environment's Role in Averting Future Food Crises, Hugo Ahlenius, Nordpil.

Modelling study shows: Africa can grow more wheat profitably

Eight SSA countries could increase wheat production profitably to meet growing demand

WHEAT for Africa conference
African MoA have endorsed wheat as a strategic crop



African working women drive wheat consumption

- As more women join the labor force, African wheat demand grows, along with urbanization
- Wheat products take less time to prepare than many other popular staples
- Africa spent \$US20bn on wheat imports in 2012

WHEAT Theme 1
(better target &
prioritize)



Dr. Nicole Mason, MSU



Kinshasa supermarket

Gender emphasis: Understand & Integrate



Two big Challenges

1. WHEAT (rural) target regions = often paternalistic, male-dominated societies
2. Developing ALL rural talent is key to sustainable greater productivity

Need for Action

- *Understand hurdles & identify sensible 'entry-points' for improving equity & equality*

Focal areas:

- WHEAT Gender audit
- Scoping Study on Strengthening Gender Integration in South Asia
- **Coming up:** Diagnosis of gender relations in wheat production, processing and marketing in key target regions

WHEAT Impacts ...

Expected Impact (as stated in 2011 Proposal, excerpts)

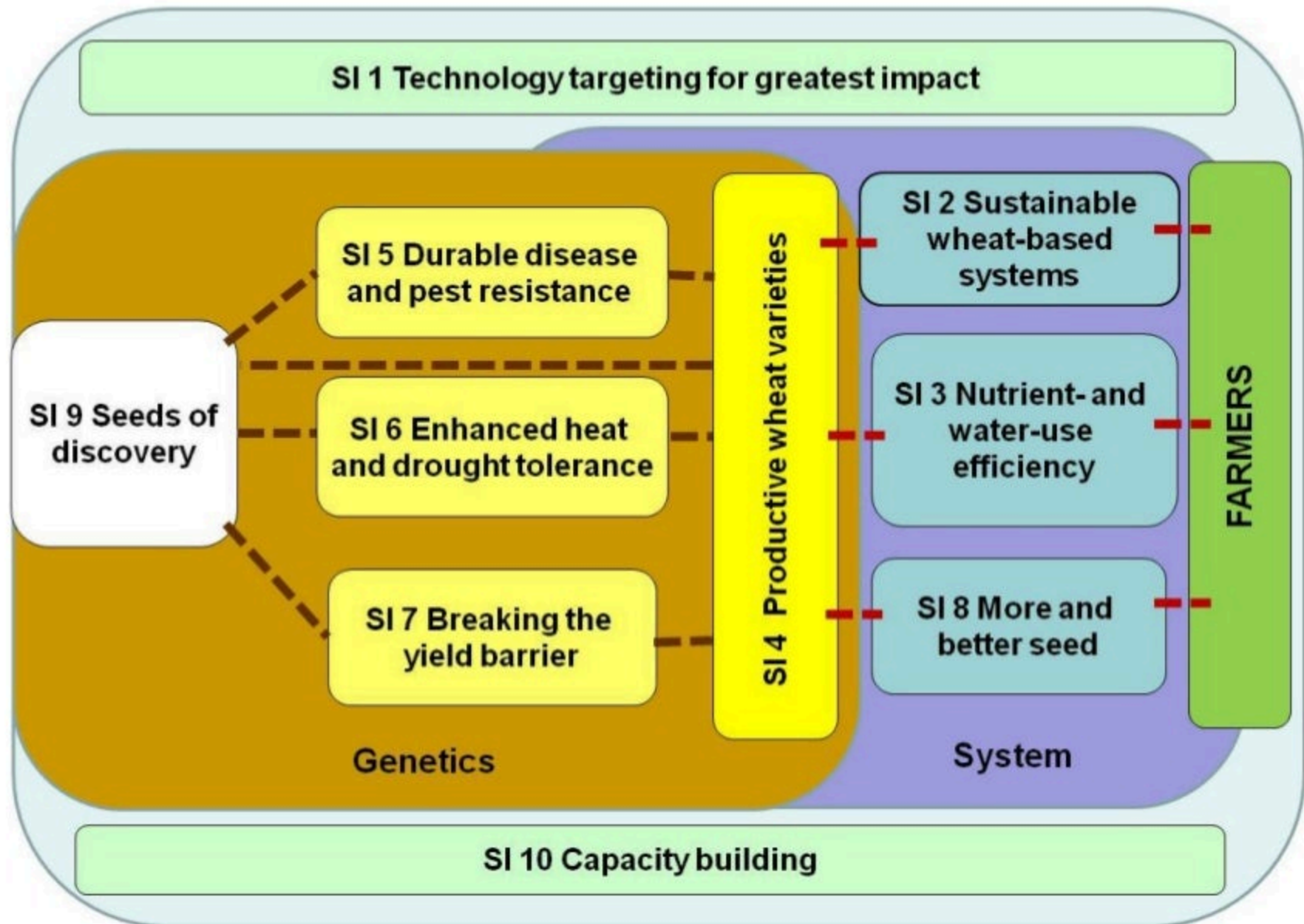
Study	Period covered	All breeding	Attributed to IWIN
Byerlee and Traxler (1996)	1966-90	\$3.0bn per year Internal rate of return of 53%	\$1.5bn per year
Heisey et al. (2002) mid-range estimate	1996-97	\$2.4bn per year	\$1.1bn per year
Lantican et al. (2005)--mid-range estimate	1988-2002	\$3.4-4.8bn per year	\$1.0 to 1.8bn per year
Marasas et al. (2004)--leaf rust resistance only	1973-2007		\$5.4bn net present value
Evenson and Rosegrant, 2002	1965-2000	With no breeding research: 9-14% reduction in output 29-61% increase in price	With no CGIAR 5-6% reduction in output 19-22% increase in price

What impact? - WHEAT re-assessed partner priorities among NARS, extension, seed companies and farmer organizations

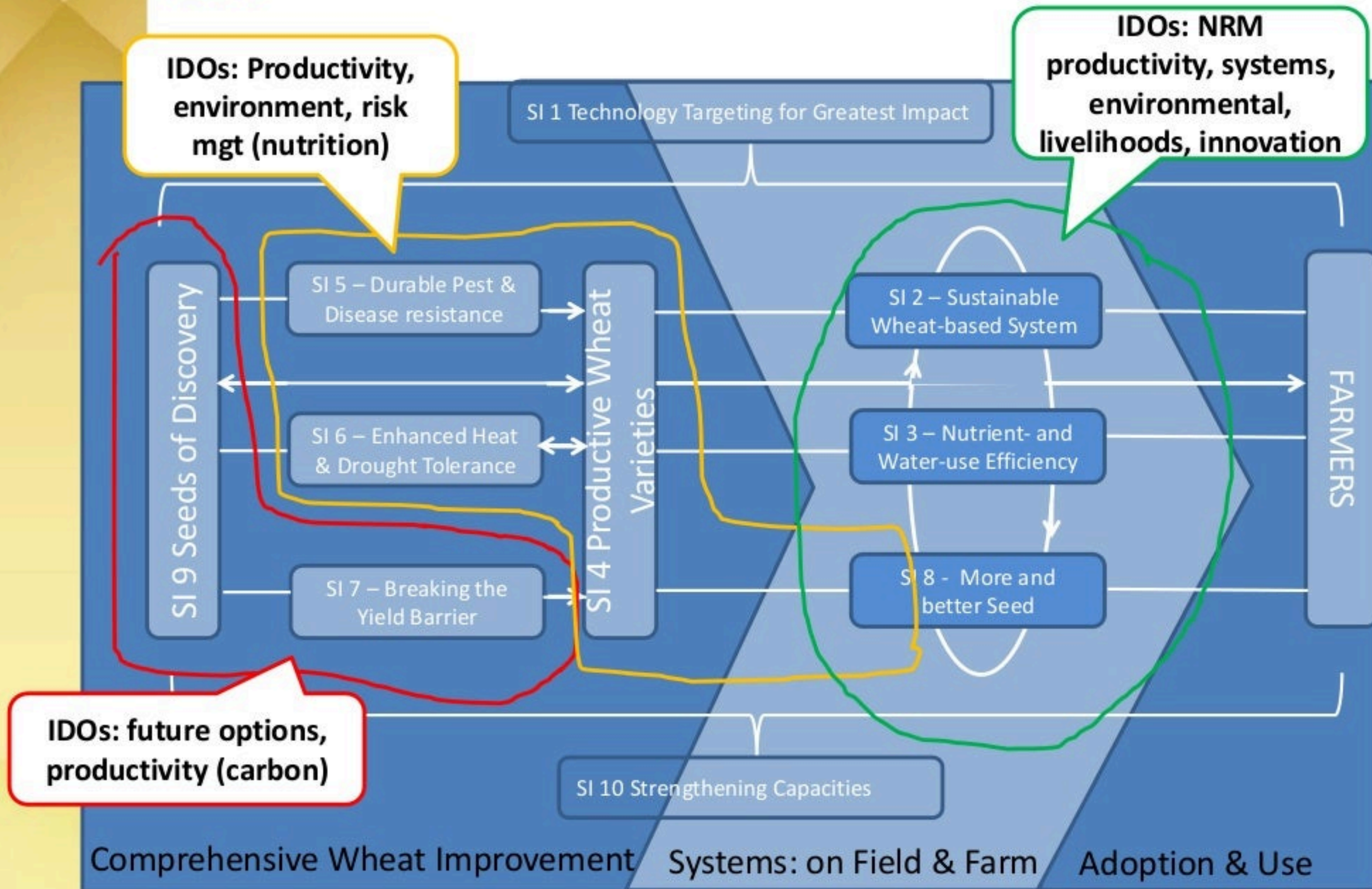
74 responses to Partner Priorities Survey

Type of Impact	Food: Increasing demands for food met. Stable food prices for poor consumers	Food and Environment: More sustainable & resilient farming systems, despite climate impact	Environment: Increased production through higher yields and better stress resistance	Poverty reduction and equity: <u>Poverty and malnutrition are reduced</u> (women and children)	Poverty reduction and equity: <u>Better access to cutting-edge technologies</u> (role of private sector)	Capacity: A new generation of scientists and other professionals
Ranking (based on no of points)	1st (1255)	2nd (1084)	2nd (1021)	4th (788)	3rd (940)	1st (1312)
1 st /1 st or 2 nd choice (no of partners)	24	7	9	4	6	15

Generating impact by delivering on an integrated set of Flagship Products



WHEAT Flagship products matched with generic IDOs



WHEAT Flagship clusters make IDOs possible

Improved varieties
onto research &
farmers fields

Sustainably grow more
with less for improved
livelihoods

SI 9 Seeds of Discovery

SI 5 – Durable Pest &
Disease resistance

SI 6 – Enhanced Heat
& Drought Tolerance

SI 7 – Breaking the
Yield Barrier

SI 4 Productive Wheat
Varieties

SI 2 – Sustainable
Wheat-based System

SI 3 – Nutrient- and
Water-use Efficiency

SI 8 – More and
better Seed

FARMERS

Frontier genetic research:
Novel diversity & break
the yield barrier

SI 10 Strengthening Capacities

Comprehensive Wheat Improvement

Systems: on Field & Farm

Adoption & Use

SI 1 Technology Targeting for Greatest Impact

Five Wheat IDOs



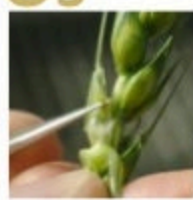
Research Strategy 1: **Sustainably grow more with less for improved livelihoods**

- System-Level Development Outcomes
SLO1 Rural Poverty
SLO2 Food Security

- **IDO 1.** Accelerated varieties release scaled out

- **IDO 2.** Farmers minimise unsustainable effects on soil, environment & improve their household income & livelihoods

- **IDO 3.** Farmers have more & better access to quality seed & use them



Research Strategy 2: **Improved varieties onto research and farmer's fields**

- System-Level Development Outcomes
SLO2 Food Security
SLO3 Nutrition & Health
SLO1 Rural Poverty

- **IDO 1.** Accelerated varieties release scaled out

- **IDO4.** Smallholders' modern wheat varieties adoption translates into higher, more stable yields in WHEAT target regions



Research Strategy 3: **Frontier Genetic Research for novel diversity & breaking the yield barrier**

- System-Level Development Outcomes
SLO2 Food Security
SLO4 Sustainability

- **IDO 5.** Faster & more significant genetic gains in breeding programs worldwide, using more effective approaches for complex traits

Next: Refine IDOs with R4D partners

Why?

- Partners are at the interface of generating impact
- Partner performance influences speed and extent of impact

What/How?

- Use “6 Questions” approach to link outputs to outcomes
- Identify necessary R4D partners and ‘required actors’
- Spell out assumptions made; define criteria for assessing performance
- Detail linkages with other CRPs: What kind? Which projects?
- Use Partner Priorities Survey responses to define IAR4D role

When?

- Sept 2013: WHEAT-Stakeholder Committee reviews and approves approach to partner engagement
- March 2014: Main agenda for WHEAT General Meeting (linked to Borlaug 100 event)

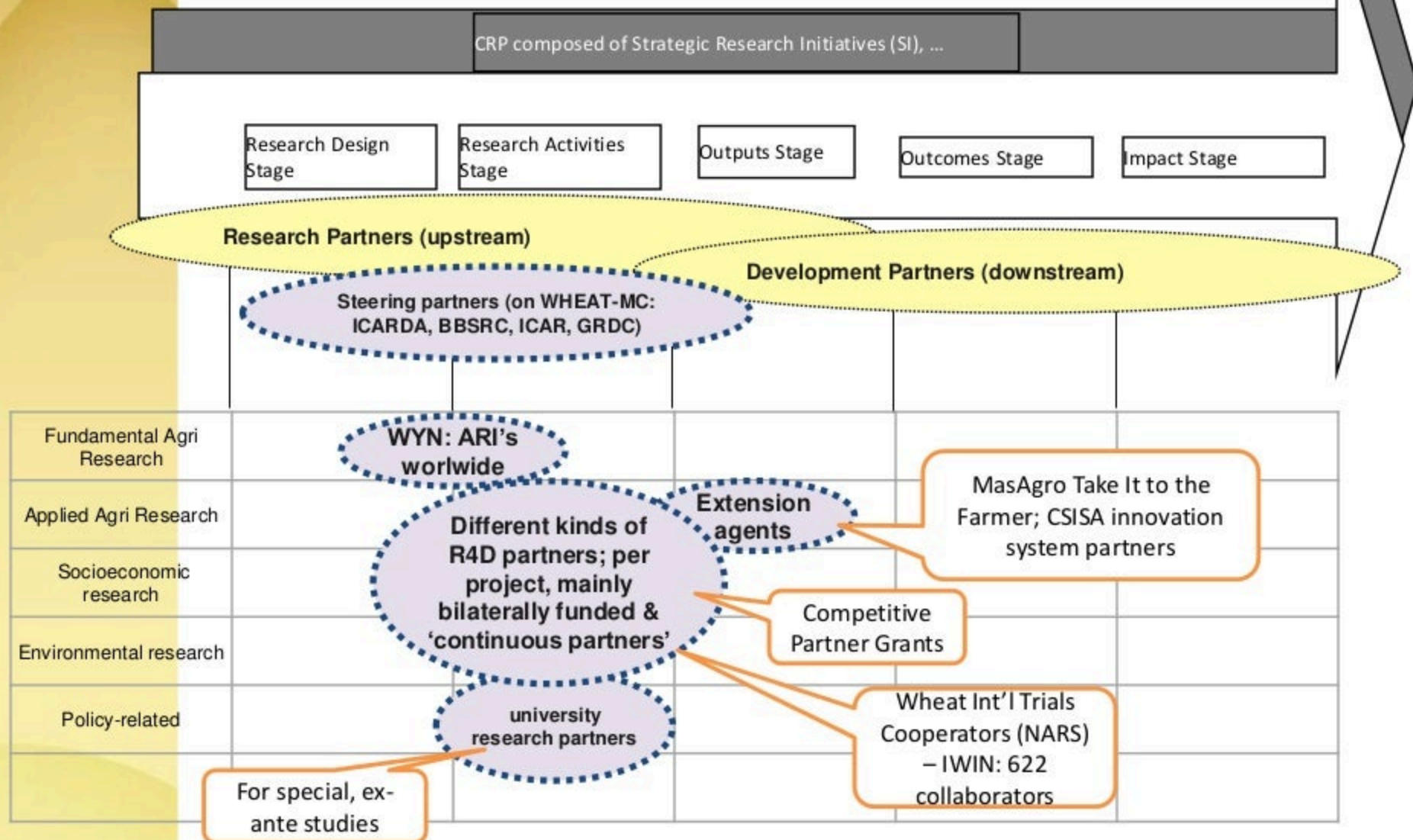
Partner Priorities among WHEAT Themes

	Theme 1 Better target, prioritise	2 wheat systems	3 precision agri (WUE, NUE)	4 better varieties	5 pests & diseases	6 heat & drought	7 break yield barrier	8 more and better seed	9 Seeds of Discover y	10 Cap Dev
Priority for own instit.	4 th	3 rd	3 rd	1 st	2 nd	2 nd	4 th	4 th	4 th	3 rd
Priority for IAR	4 th	3 rd	4 th	1 st	1 st	2 nd	4 th	4 th	4 th	3 rd

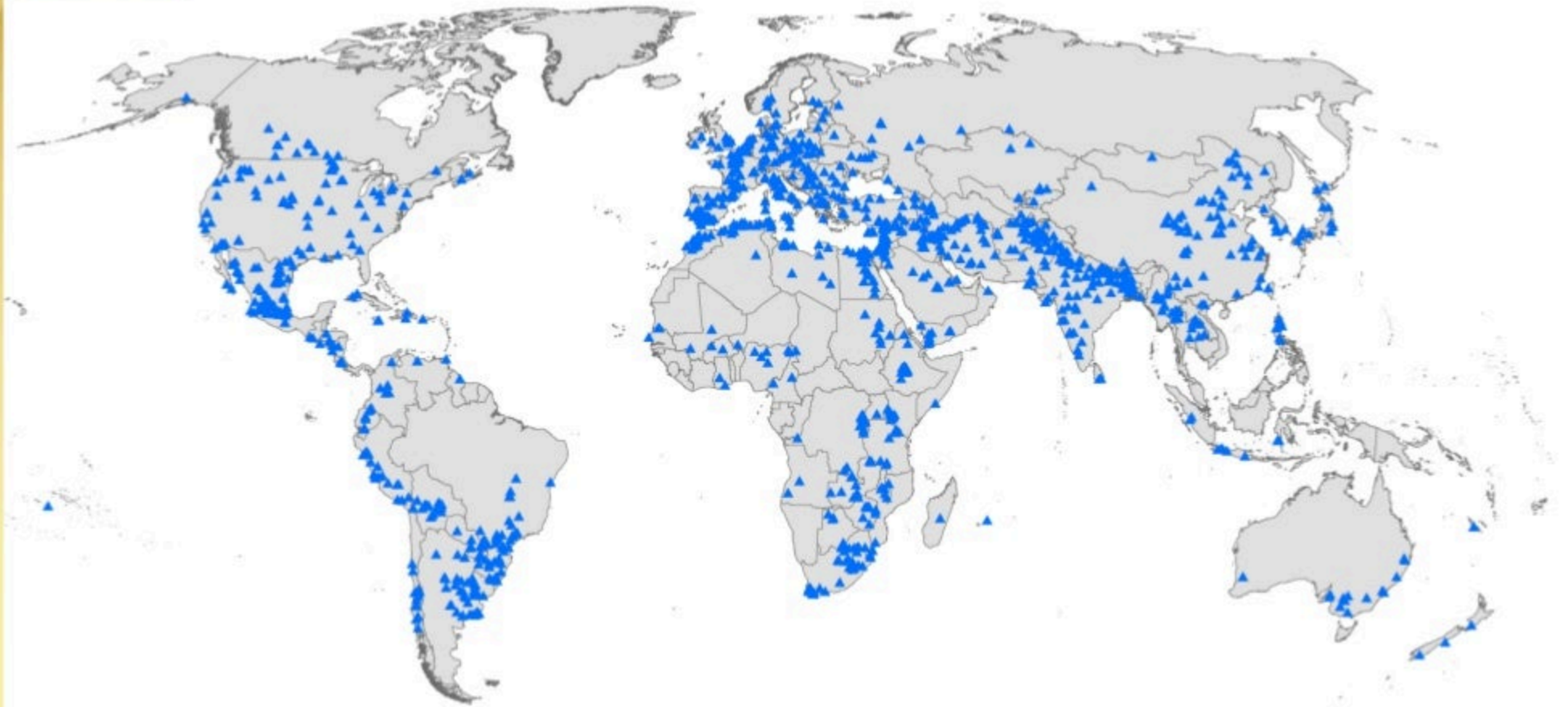
Divergence of partner and donor perceptions

Interpretation and use of results?

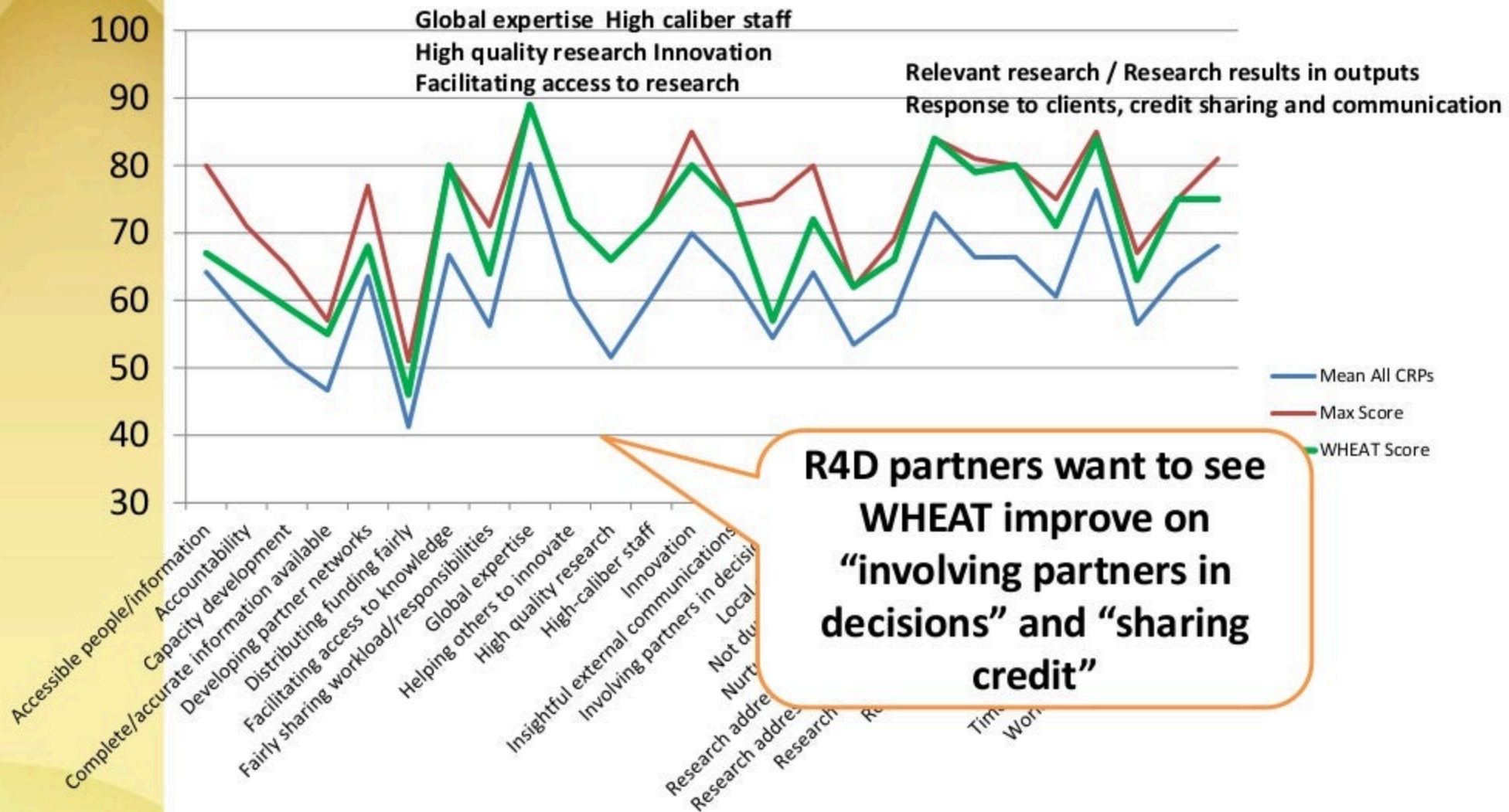
WHEATs different kinds of partners ...



620 cooperators want WHEAT germplasm on an annual basis: Growing demand!



CGIAR Partner Perception Survey: WHEAT compared to other CRPs



Partnership realities and desired future

Now

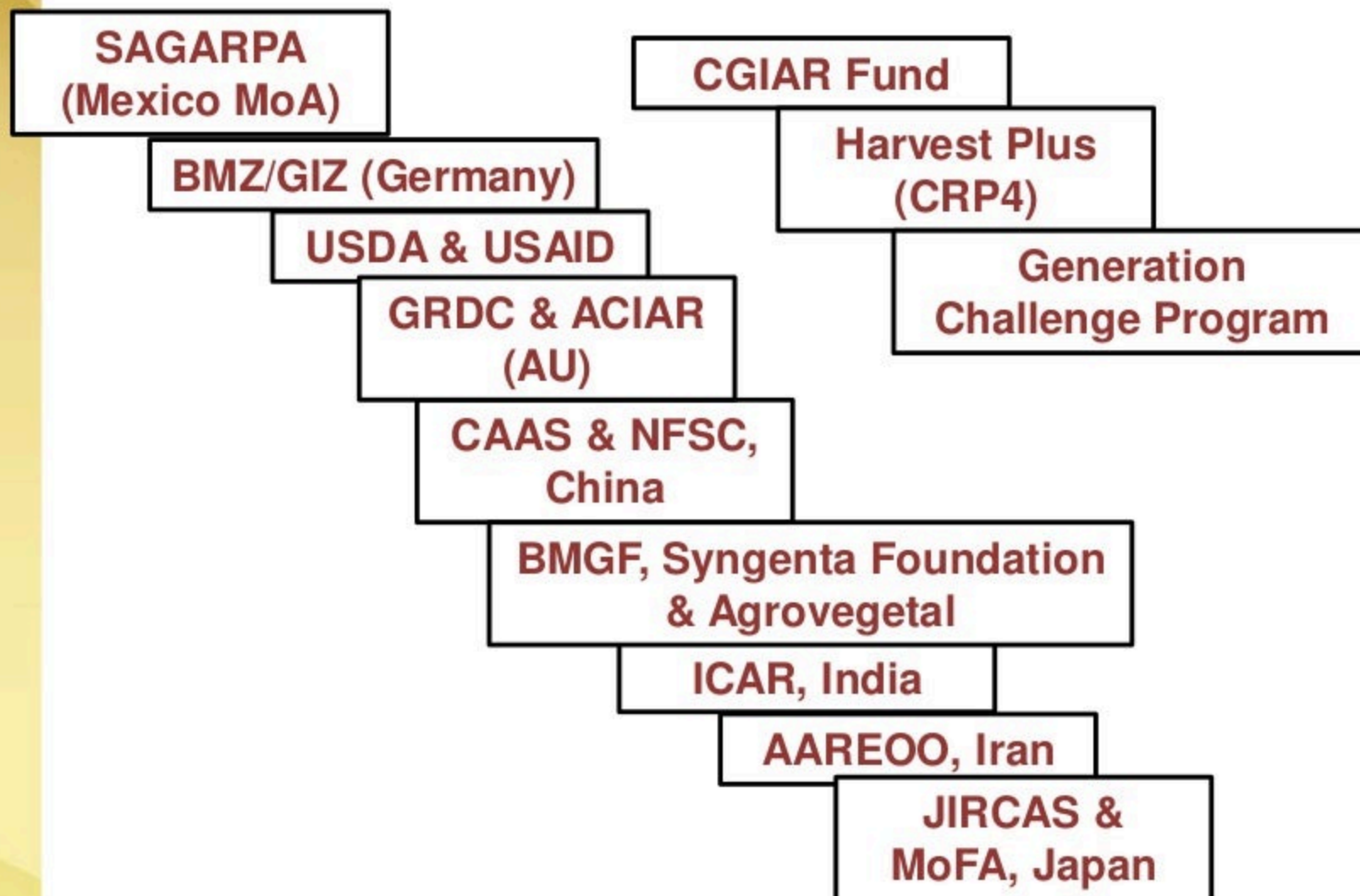
- Funds: W1/2 & bilateral flow-thru + extra Partner Budget (Competitive Partner Grants)
- CIMMYT and ICARDA partner on program management & research delivery
- Program Management Partners
 - Internal: CIMMYT, ICARDA
 - External: BBSRC, GRDC, ICAR
- Steering Partners
 - Broader partner involvement in strategy dev: Launch Conference & Partner Priorities Survey

In Future

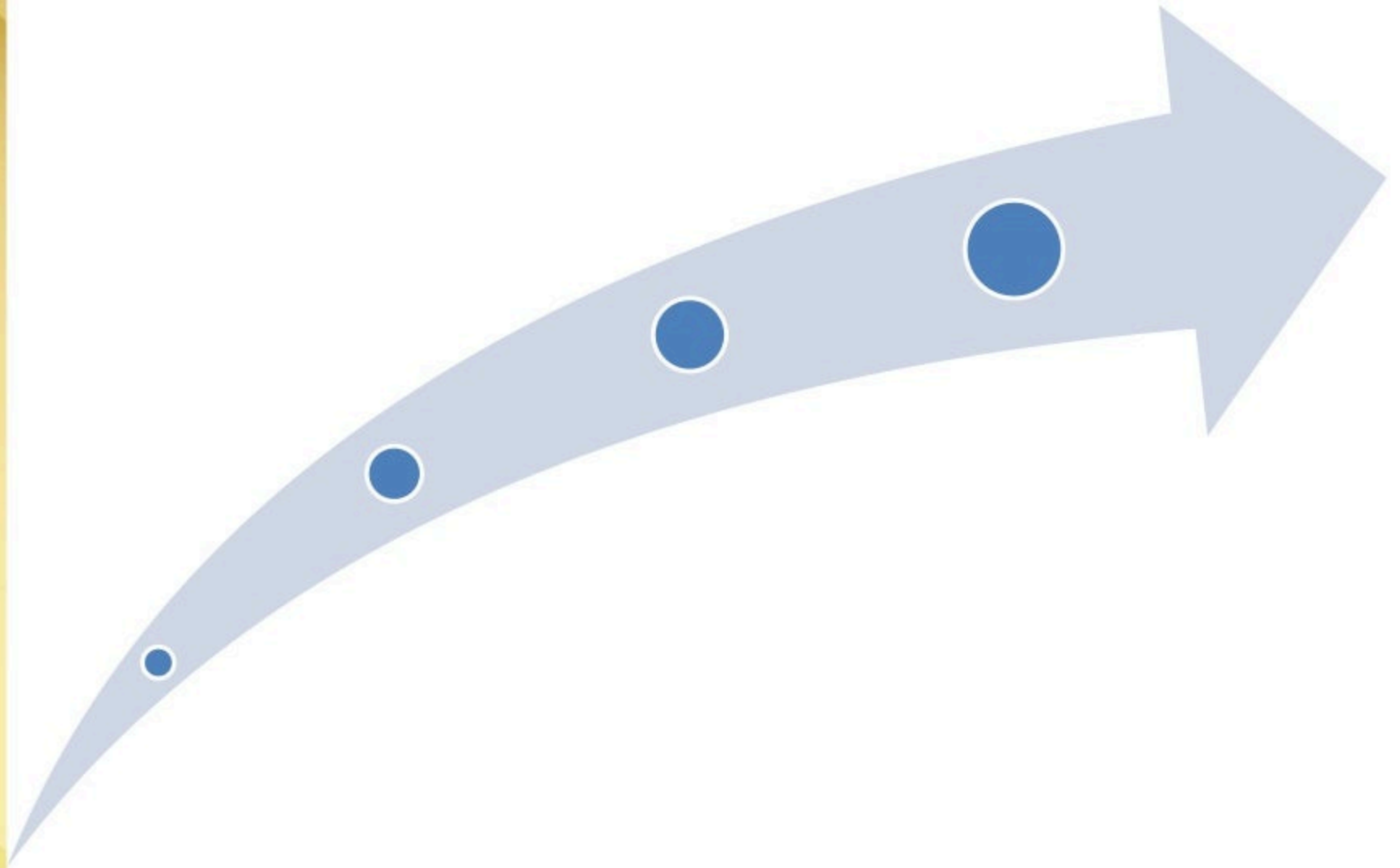
- Better know, evaluate our partners, act on that knowledge
 - Different & better (not more) partners
 - Spend more time/effort on p'ship relationship mgt
- Partners' perspective: Make clearer how partners will be involved at different levels (research priorities, design, delivery)
 - Driven by adjusting Themes' project portfolio to national/regional priorities
 - More joint fundraising

Donors who make partnering possible

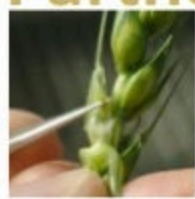
Selected; from 59 active grants in 2012, of which 20 are funded by W1&2



Way Forward for WHEAT



Way forward: Partnerships for IDO Impact



Coalition for Wheat for Africa (W4A)

- System-Level Development Outcomes
SLO1 Rural Poverty
SLO2 Food Security

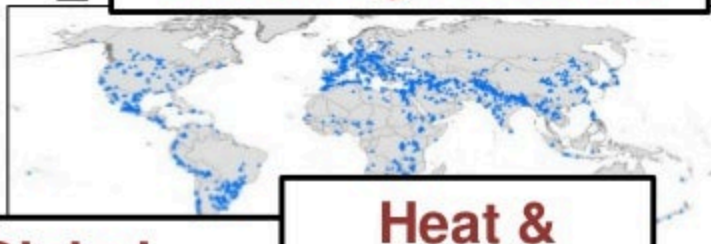
Regional, multi-hub & - stakeholder R4D programs

Improved varieties onto regional and farmer

SLO2 Food Security
SLO3 Nutrition & Health
SLO1 Rural Poverty

• IDO 1. Accelerated varieties release

Faster Global Breeding Platform



Global Phenotyping Platform

Heat & Drought Consortium

Research Strategy 3: Frontier Genetic Research for novel diversity & breaking the yield barrier

- System-Level Development Outcomes
SLO2 Food Security
SLO4 Sustainability

Wheat Yield Network based on MEXIPLAT Platform

approaches for

Seeds of Discovery

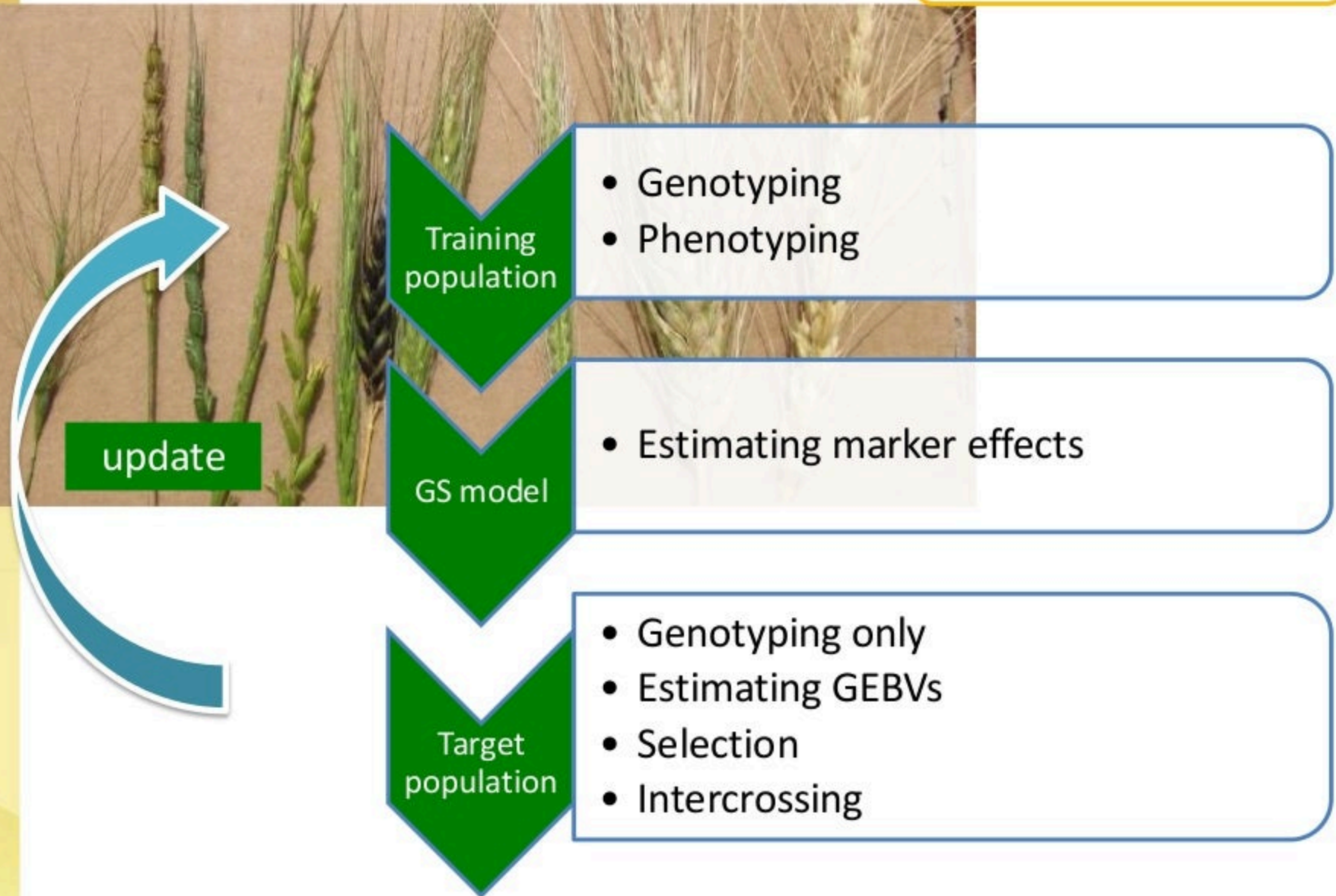
more with less
ed livelihoods

Research Strategy 1: Sustainable

minimise unsustainable effects on soil, environment & improve their household income & livelihoods
IDO 3. Farmers have more & better access to quality seed & use them

Way forward: Genomics enables faster breeding success

Improved varieties onto research & farmers fields



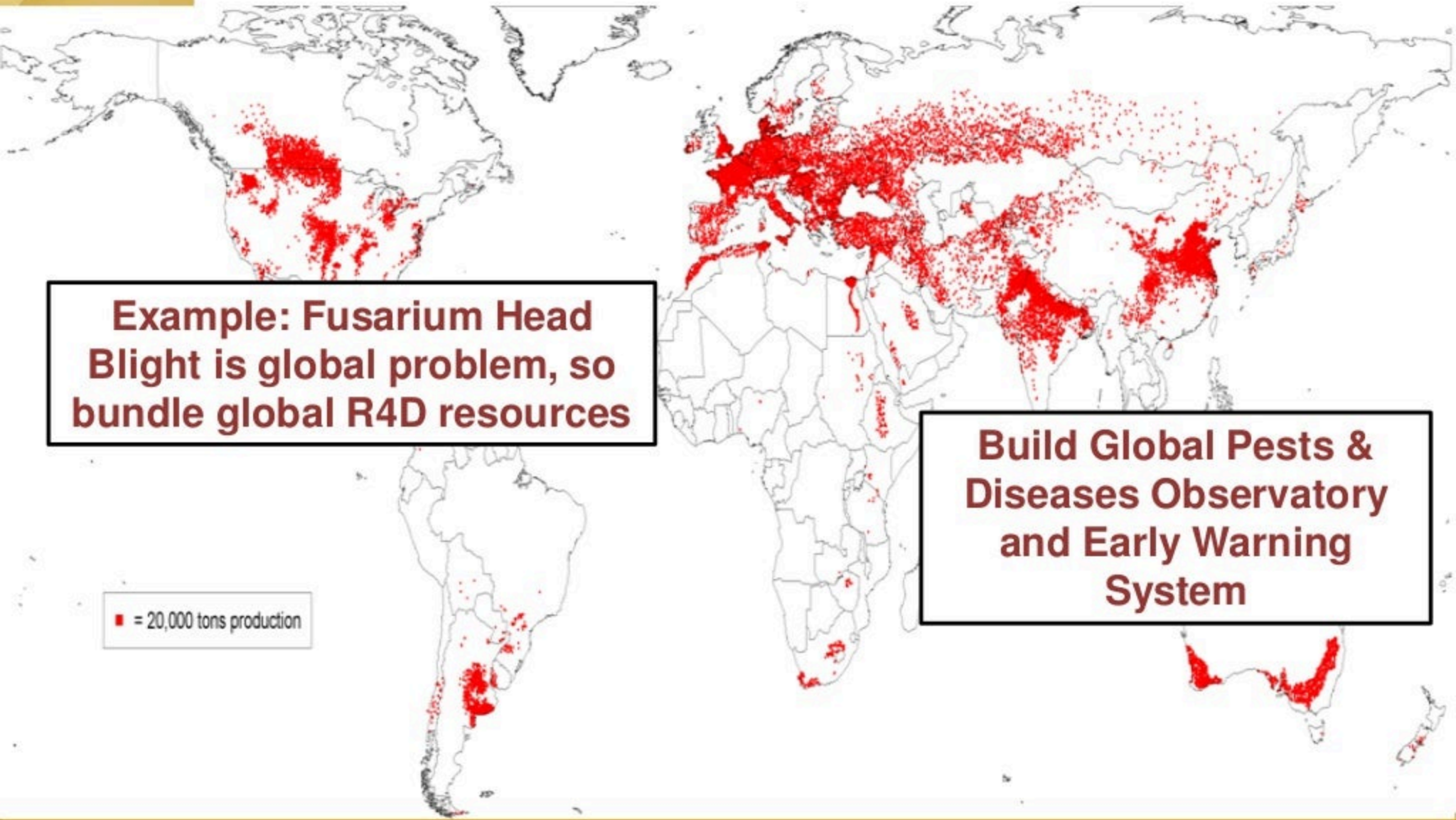
Way forward: Collaboratively fight major pests and diseases

Improved varieties onto research & farmers fields

Example: Fusarium Head Blight is global problem, so bundle global R4D resources

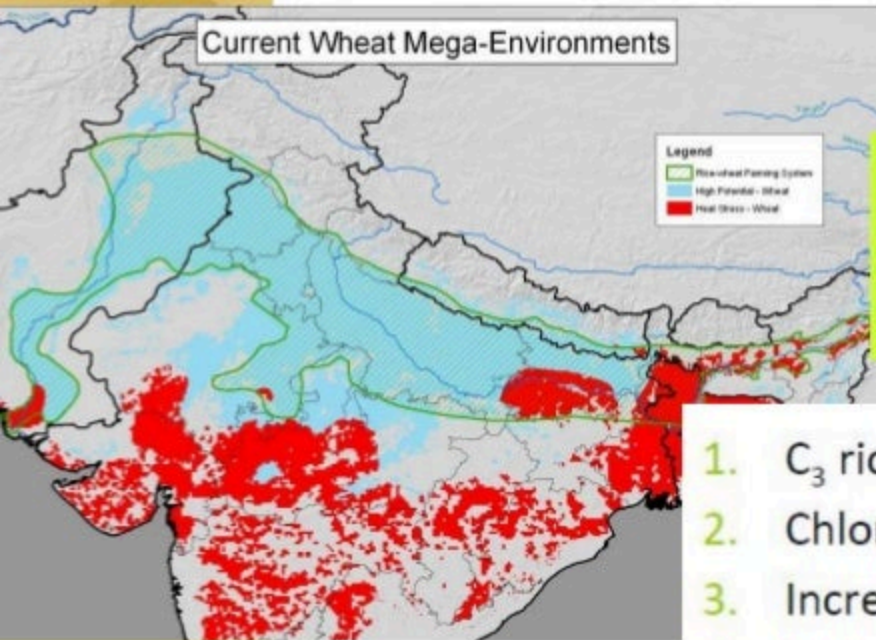
Build Global Pests & Diseases Observatory and Early Warning System

■ = 20,000 tons production



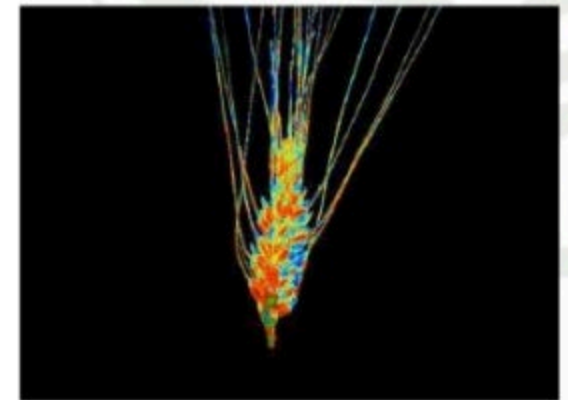
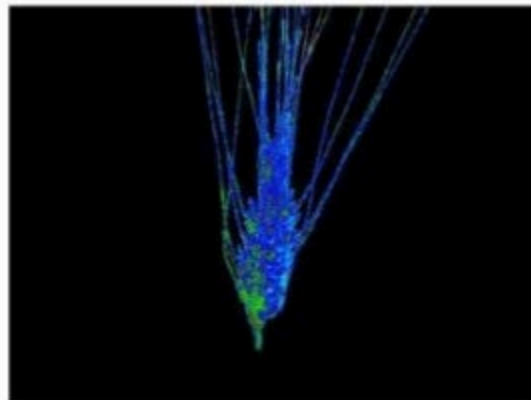
Wheat needs to beat the heat: Photosynthetic Efficiency (WYN)

Frontier genetic research:
Novel diversity & break
the yield barrier

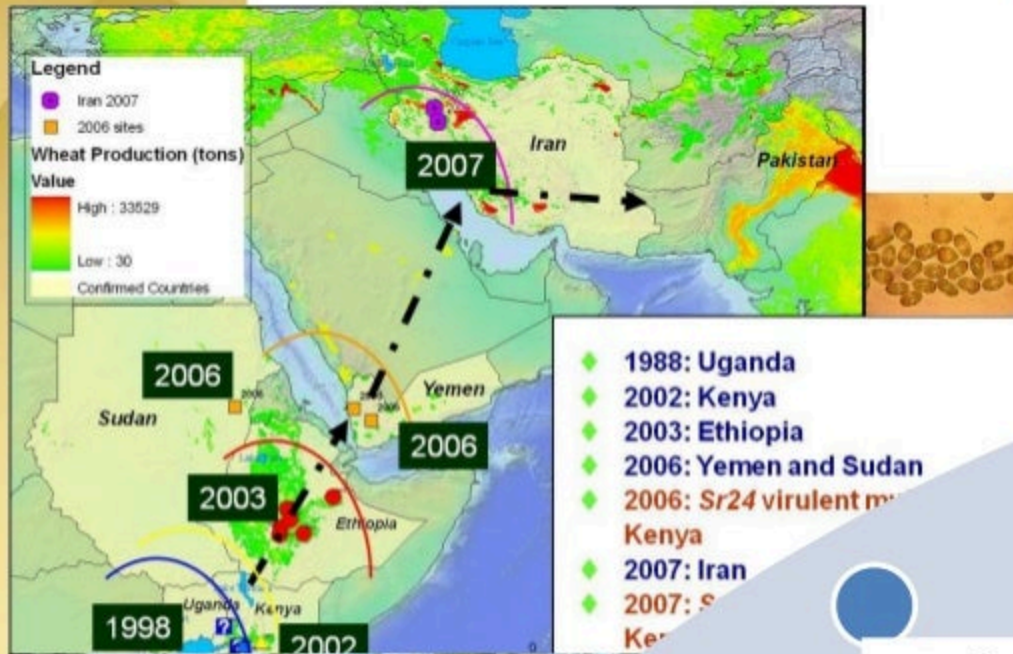


Food security of 1 billion people in South Asia affected by climate change >> accelerating food price inflation

1. C_3 rice to C_4 rice (IRRI)
2. Chloroplast CO_2 pumps in wheat (CIMMYT-WYC)
3. Increased RuBP regeneration in wheat (CIMMYT-WYC)
4. Improved thermal stability of Rubiscoactivase (CIMMYT-WYC)



Ways Forward for WHEAT



Phase III

Phase II:
2015-
2020

Phase I:
2012-14

