WHEAT Global Partners Meeting: Where should WHEAT be headed 2017-21?
Istanbul, Turkey, 8-9th December 2014

Meeting Aims:

1. Define research scope of WHEAT Flagship Projects (FPs) for Phase II (2017-21), including gender and capacity development objectives
2. Determine development outcomes per FP and the partners & partnership needed to make them happen
3. Agree on next steps towards detailing project designs & leadership during 2015

Participants: WHEAT R&D partners (NARES, developed world advanced research institutes), CIMMYT and ICARDA scientists

Agenda

Day 1 (Mon 8th Dec): Review and refine WHEAT Flagship Projects

Timing	Step
9:00	Welcome, Aims and Agenda
9:15 with Q&A (10 min)	Updates on WHEAT Strategic Direction: • The big challenges to 2030 / 2050 • CGIAR context (SRF & development outcomes, CRPs Phase 2 process, timeline) • R&D partners' feedback so far (Partner Priorities Survey)
10:00 with Q&A (10 min)	Preliminary findings of the 2014 External Evaluation of WHEAT
10:30	Coffee break
11:00 with Q&A (15 min) Fact sheets to share	Updates on specific initiatives under WHEAT: 1. International Wheat Yield Partnership 2. Heat and Drought Wheat Improvement Consortium (HeDWIC) 3. Seeds of Discovery 4. Gender Strategy
12:00	Lunch
13:00	Introduction to groupwork on Flagship Projects: Desired results, how to do it
13:30 5 workgroups, can form sub-groups per CoA	Review Flagship Projects and their Clusters of Activity (CoA): • What to keep-as-is & what to change (add, amend, drop): Describe multi-year researchable issues & outputs, identify gender mainstreaming or strategic research objectives, who are the first users of project outputs, who are the ultimate beneficiaries • What does my FP/CoA give or take from other FPs/CoAs?
15:00	Coffee break
15:30	Continue with group work (see above)
17:00 5x20 min	Present group work results in plenary and get feedback from other participants
19:00	Close
19:30	Joint Dinner

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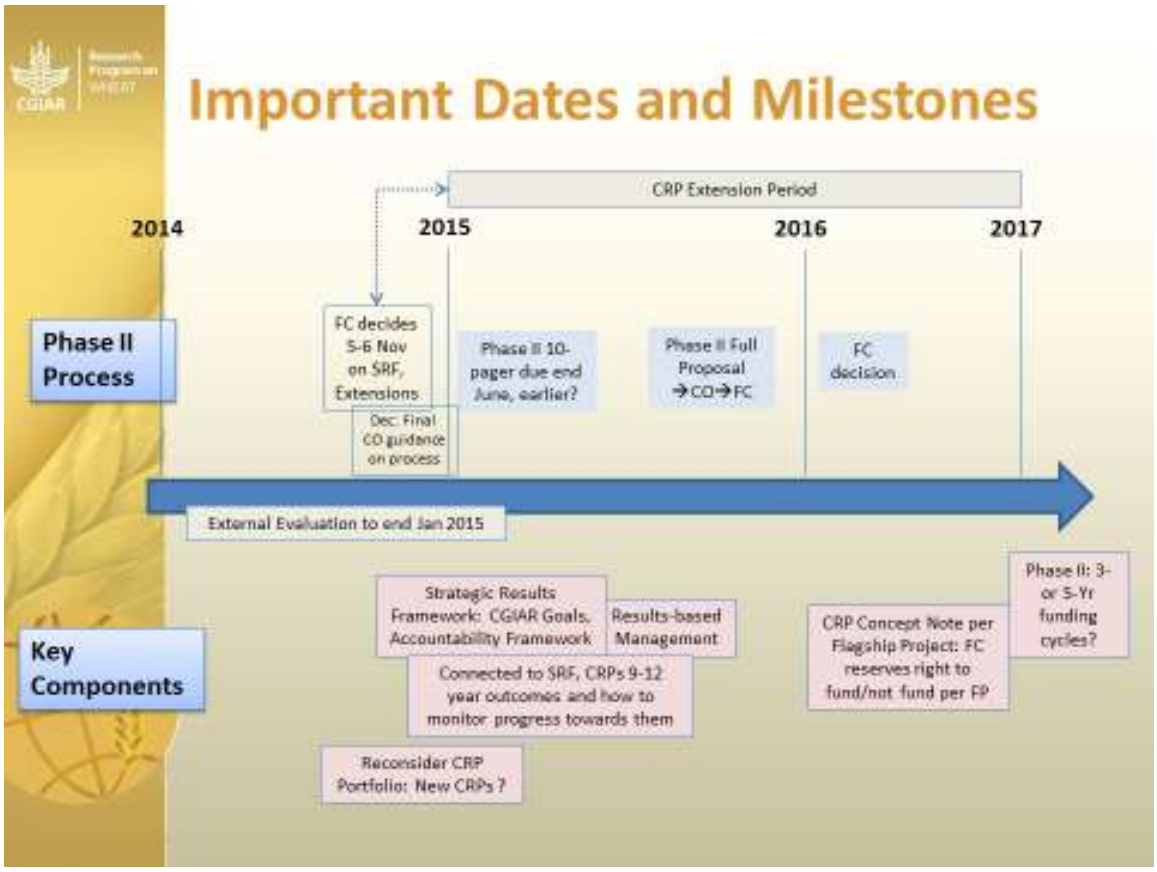
Day 2 (Tues 9th Dec): Flagship Projects and Outcomes; Next Steps

Timing	**Step**
9:00	Recap & today's agenda
9:15	Briefing on Development Outcomes and Impact Pathways to get there • Sustainable Development Goals relevant to AR4D • Recap on the CGIAR SRF • Impact Pathways for germplasm improvement and sustainable intensification and partnerships
9:30	Briefing on how to do the group work
9:45 5 groups	FP workgroups, for each FP • Broadly define how each FP contributes to one or more Development Outcomes • Review Germplasm & Sustainable Intensification Impact Pathways • What kind of partners and partnerships are necessary to get to the Outcomes?
10:45	Coffee break
11:00	Continue with FP workgroups
12:30	Lunch
13:30 5 groups	Working groups share their findings on Outcomes, Pathways and Partners and get feedback in plenary
15:00	Coffee break
15:30	Brainstorm in plenary: What critical cross-FP issues do you see?
16:00 Provide template	Back to workgroups: What are the next steps towards making the FPs a reality in 2017?
16:45	Back in Plenary: Consolidate Next Steps
18:00	Thank you and Closing



Note: The timelines may change. You will be fully briefed and updated during the Dec 2014 meeting.

Useful links for further information about WHEAT:

http://wheat.org/documents-about-wheat/?cp=1

http://www.cgiar.org/our-research/cgiar-research-programs/

http://www.cgiar.org/our-research/cgiar-research-programs/cgiar-research-program-on-wheat/

http://www.cimmyt.org/en/wheat-matters

http://www.icarda.org/search/node/wheat

From 10 Strategic Initiatives to 5 Flagship Projects made up of Clusters of Activities
(Text below from WHEAT Extension Period Proposal; CGIAR Fund Council decides about this proposal / W1&2 funding 2015-16 on 6th Nov 2014)

WHEAT is consolidating its rolling 10-year R4D agenda into five FPs (Figure 1), with defined linkages to, and accountabilities for Intermediate Development Outcomes (IDOs). The five FPs together pursue the two WHEAT research strategies: '**Germplasm**' and '**Sustainable Intensification of Wheat Systems**' (blue in Fig 1).

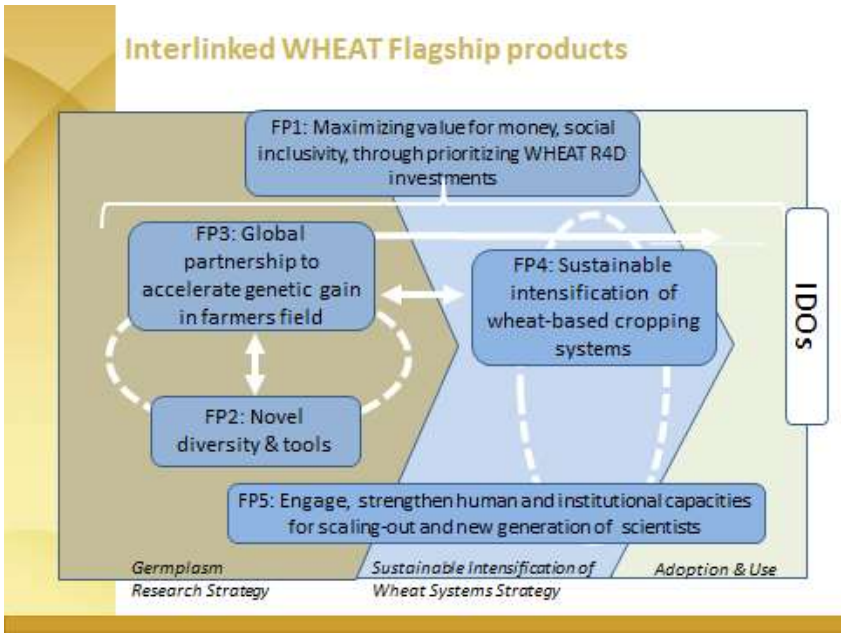


Fig. 1: WHEAT Flagship Projects matched to research strategies

The **Germplasm research strategy** seeks to accelerate the breeding cycle and achieve higher genetic gains through several innovations through FP2: Genomic selection, molecular markers and decentralized precision phenotyping. Additional Clusters of Activities (CoAs) within FP2 will increase the wheat yield potential and source high value genetics from unexploited landraces and wild relatives, latter to increase wheat's adaptability to changing conditions, in particular heat and drought, and reduce its genetic vulnerability. Novel tools and genetic diversity are being used in FP3 to provide national public and private sector partners (NARES) with phenotypically and genotypically characterized genebank accessions and elite germplasm, to incorporate in their breeding programs, adapt to 'their' conditions and to release to farmers, who benefit from increased productivity (IDO1, see Table 1), reduced production risks and greater incomes (IDO4). Poor wheat consumers will benefit from greater price stability, lower prices and hence greater food security. Impact pathways and contributions by partners are well established through a global network encompassing 232 collaborators in 70 countries[1].

The **Sustainable Intensification of Wheat Systems research strategy** uses a better understanding of wheat-based farming systems to develop comprehensive, climate-smart genotype by environment by management (**G**enotype x **E**nvironment x **M**anagement) solutions co-developed with local partners, farmers and value chain participants: Conservation and precision agriculture, heat tolerance and nitrogen-use efficiency are projected to have the greatest impact on global wheat yields in 2050[2]. These technologies enable women and men farmers to improve farm-level incomes (IDO4), grow the same amount with fewer inputs and despite climate change and other external stresses (IDO1, 2) and with less negative externalities on the environment (IDO9). FP4 target groups are poor households in systems where wheat is a major source of livelihoods and/or food security. Those farmers, characterized by great social heterogeneity, often depend on other commodities (cash crops, livestock) and off-farm income to sustain their livelihood (Herrero et al., 2010). Under FP4, WHEAT currently collaborates with other CRPs on 45 innovation

[1] 2013 collaborator and germplasm/data-sharing statistics; International Wheat Improvement Network (IWIN).
[2] Ibid., IFPRI, 2013 Global Food Policy Report, p.45-48. Note that Heat tolerance and NUE are variables to evaluate climate-smart solutions.

platforms, most prominently GRiSP, MAIZE, PIM, Dryland Systems and CCAFS, and reaches out to 17-20,000 farmers every year (2013 WHEAT Annual Report, Annex 3 & 4). **Germplasm and Systems value streams come together** in FP5, which focuses on seed system innovations at national level, building diverse partner coalitions to further adapt and scale out appropriate integrated technology packages and strengthening WHEAT partners' capacities currently in 31 countries[3].
All FPs are guided by FP1, in terms of targeting and prioritizing R4D and strategic gender research for greater impact (IDO5).

Table 3: WHEAT Flagship Projects and their Clusters of Activity

FPs	*1 Maximizing value for money, social inclusivity thru prioritizing WHEAT R4D investments*	*2 Novel diversity and tools to adapt to climate change and resource constraints*	*3 Global partnership to accelerate genetic gain in farmers field*	*4 Sustainable intensification of wheat-based cropping systems*	*5 Human and institutional capacities for seed systems and scaling-out; a new generation of wheat scientists*
CoAs	1.1 Foresight and targeting (ex ante)	2.1 Seeds of Discovery	3.1 Global Breeding Platform (IWIN) for traits suited to different needs and target groups	4.1 Multi-scale farming system framework to better integrate & enhance adoption of sustainable intensification options (linked to FP5, which works at wider scale)	5.1 Enable national coalition of multiple partners for technologies packages scale-out including seed system innovations
	1.2 Adoption/impact pathway analysis & (ex-post) impact assessment	2.2 Affordable Hybrids	3.2 Accelerate breeding cycle through genomics, improved bioinformatics, and data management	4.2 Participatory approaches to adapt and integrate technological components	5.2 International short-term trainings (POWB 10.1. – 10.4.) for female and male professionals
	1.3 Gender Strategic Research & support mainstreaming	2.3 Wheat Yield Partnership (IWYP) to break the genetic yield barrier	3.3 Precision field-based Phenotyping Platforms for key traits	4.3 Development and field testing of agronomic technologies (has 6 sub-categories)	5.3 Wheat University and WHEAT Volunteers: To build the next generation of scientists
		2.4 Heat and Drought Tolerance to Combat Climate Change (HEDWIC)	3.4 Durable Rust Resistance & Monitoring for gender-responsive Food Security		
		2.5 Biological Nitrification Inhibition: Cytogenetic and pre-breeding for NUE	3.5 Resistance & Monitoring of major diseases and pests other than rusts		
		2.6 Pre-breeding: Transfer new alleles, translocations for prioritized traits from exotic sources into elite lines	3.6 Genetic improvement to contribute to food safety		

[3] NARS capacity development and technology scaling-out projects in Afghanistan, Ethiopia, Irak, Kurdistan, Libya, Mexico (MasAgro), Pakistan, Turkey & 4 countries S. Asia (CSISA), 6 CWANA countries (FSE), 10 African countries (SARD-SC/Wheat) and 3 Central Asian countries (competitive partner grant).

The five FPs are focused on outcome-oriented value propositions that allow prioritizing among WHEAT interventions and drive budget allocation. Each FP is subdivided into Cluster of Activities, jointly conceived with partners during the original WHEAT proposal development phase and in 2012-13, through a WHEAT Partner Priorities Survey. It received a response from 92 R&D partners in 40 countries.

FP1 ***Maximizing value for money and social inclusivity through prioritization of WHEAT R4D investments***: Define the scope of WHEAT for maximizing socially inclusive food security and poverty alleviation and enhance and measure its success.

FP2 ***Novel diversity to faster adapt wheat to climate change and resource constraints*****:** Genebank collections are characterized phenotypically and genotypically for where genetic variation is currently missing in priority traits. Options for wheat hybridization, increased wheat yield potential, and NUE are pursued in collaboration with ARIs and the private sector for use by WHEAT partners in the developing world. Discovery and introgression of new alleles and traits into adapted germplasm will have a major impact on accelerating genetic gain (FP3) and intensification (FP4). This will lead to leaps in genetic yield potential, climate change adaptation and nutrient use. Discovery of affordable hybrid technologies would attract increased private sector investment.

FP3: ***Global partnership to accelerate genetic gain in farmers' field*****:** Climate resilient, disease and pest tolerant, nutritious wheat lines with high end use quality are developed with new molecular based breeding tools and selection methods. NARS partners participate in breeding, apply more precise phenotying approaches and other tools to develop diverse, high yielding varieties, adopted to farmers needs in in Asia, Africa and Latin America – so that globally, annual genetic yield gains of at least 0.7% are achieved.

FP 4***: Sustainable intensification of wheat-based cropping systems:*** FP4 is about farmers closing the yield gap to contribute to regional food availability and price stability. FP4 focuses on managing for profitability, inclusive growth, and environmental quality. Primary beneficiaries and co-innovators are poorer households in systems where wheat is a major source of livelihood, next to other crops, livestock and off-farm work. They will be involved in gender-responsive, process-based research to choose interventions with greatest impact on the targeted IDOs. FP4 will work on innovation that increase resource use efficiencies and reduce soil degradation in highly productive and marginal wheat areas. Productivity and risk management options will be tested with farmers, with emphasis on developing scalable knowledge products and decision support systems, such as those linking to remote sensing and cell phone technologies, so that 'last mile providers' and boundary partners reach more farmers with the best site-specific crop management practices.

FP5: ***Human and institutional capacities for seed systems and scaling-out****:* FP 5 enables national coalitions of development and policy partners to integrate tried and tested technologies from FP3 & 4 insights. WHEATs role is to accelerate national initiatives for more rapid uptake of knowledge, local adaption and feedback and scaling-out. This is demand-driven by coalition partners, who identify gaps in current and past AR4D projects and develop locally adapted comprehensive solutions.

What is new for the Phase 2015-2016?

(Note: Depends on whether Fund Council approves funding requested for 'what's new')

FP1*:* seeks greater investments in three areas

- To strengthen ex-ante, foresight and targeting analysis and develop a more comprehensive business case for WHEAT Phase 2, in collaboration with PIM and A4NH: In particular, FP1 intends to investigate the relevance of wheat quality, nutrition and post-harvest investments for achieving IDOs.
- Jointly with CCARDESA, establish the production and market potential for African smallholder engaging in wheat-as-cash crop production in at least one of the target regions, complementing the on-going collaboration with ASARECA.
- By end of 2016, FP1 will have guidelines for gender-responsive development of wheat-based systems implemented in different parts of South Asia. This requires gender R&D capacities resident in South Asia.

FP2 & FP3 expand their scope in the following areas to increase on-farm genetic gains to a level of 0.7% - 1% p.a.[4] (in addition to similar increases expected from FP4):

- Increase R4D investment on how to use genomic selection (GS) for faster and more precise breeding (FP2). Kansas State University, Cornell University and WHEAT are leading the largest GS public sector projects on wheat, focusing on yield and heat. WHEAT wants to expand this collaboration to a greater number of developing countries that have capacities to apply GS in impact oriented wheat breeding programs. This investment will leverage W1&2 funds deployed during Phase 1.
- Aligned with a joint initiative between the BMGF and the Consortium, additional resources are sought for bioinformatics, database development and open access to bring high-density genomics data globally into use for breeding and to validate International Breeding Platform tools (FP3).
- Higher quality phenotyping data are paramount to fully utilizing the potential of new molecular selection technologies. With co-investing NARS, WHEAT will set up seven of ultimately 15 Precision Phenotyping Platforms, forming a global phenotyping network for pre-breeding during Phase II. The platforms will support implementation of molecular tools and provide NARS with earlier access to more diverse germplasm, enabling their own breeding programs and the release of genetically more diverse varieties (FP3).
- WHEAT will contribute to the Biotechnology and Biological Sciences Research Council (BBSRC/UK) and USAID-led International Wheat Yield Partnership (IWYP), which aims to increase the genetic yield potential of more photosynthetic efficient wheat by 50% in 2035. Under FP2, WHEAT will expand the WYNHUB (pre-) breeding platform screening capacity.
- Investments in applying GS and in phenotyping platforms will deliver more precise data for the Heat and Drought Wheat Improvement Consortium (HEDWIC), which will improve the genetic basis of heat and drought adaptation and one of the top four agricultural technologies identified for increasing global yields by 2050[5]. In spite of climate change-induced wheat production reductions of 20-30% by 2050, investments in trait identification for heat and drought tolerance

[4] Yield Trends Are Insufficient to Double Global Crop Production by 2050, Deepak K. Ray et al, PLOS ONE, Vol.8, June 2013.
[5] IFPRI, 2013 Global Food Policy Report, Chapter 4: The Promise of Innovative Farming Practices, p.47.

have been low. WHEAT will set up an initial round of competitive grants in support of a stronger trait pipeline (FP3).

- FP2 also aims to leverage bilateral investment in research on biological nitrification inhibition (BNI) by JIRCAS, to identify wheat cultivars with high BNI potential and attract greater JIRCAS funding for WHEAT Phase 2.

FP4 intends to strengthen two areas of research

- Upstream research to analyze and capitalize on lessons learnt from the sustainable intensification of wheat systems, contributing to cross-CRP learning: Sustainability encompasses economic, environment, and social dimensions. Data from ongoing R4D in regional projects in South Asia, Mexico and Africa will be integrated to better understand agro-ecological, economic and socio-cultural systems dynamics; analyze and document the innovation platform-driven successes and lessons for non-adoption; analyze trade-offs, also based on long-term experiments and design more focused intensification options empowering female and male household members. This analytical research will be shared with Systems CRPs, GRiSP, MAIZE, CCAFS, Water, Land and Ecosystems and PIM for greater cross-CRP conceptualization and understanding of impactful system-based R4D approaches.
- Capitalizing on increasing South-South collaboration on mechanization, and substantial successes with implementing sensor technologies for improved nutrient management, FP4 intends to further strengthen its project portfolio on appropriate-scale mechanization, smart phone and internet mediated knowledge products and remote sensing/decision support systems.

FP5 seeks stronger alignments with government programs or bilaterally funded development projects from a wide range of donors in wheat growing areas, to enable coalitions of scaling-out partners. Increased efforts will be made for international training and to link scholarship opportunities with cutting edge WHEAT research, including the better understanding of non-adoption and scale-out drivers[6] - and ongoing post-doc research of young professionals in four IWYP project areas[7].

Greater FP1 and FP4 investments in conceptualization and IDOs-focused targeting will allow WHEAT to identify trade-offs between different kinds of interventions and adjust FP priorities and project portfolio. Accelerating breeding gains and new technologies under FP2&3, as well as bringing precision agriculture technologies on-farm under FP4, will contribute to achieving the annual 1.6% yield gain required – and should mobilize self-sponsored innovation and co-investments from ARIs, NARS and their national governments.

[6] Future Resource Needs for CGIAR: Preliminary Thoughts; presented at Fund Council 9, 26th April 2013 under 'Strategic Issues: Framing and costing of the next generation of agricultural research: "Although much can be accomplished through better application of known technologies to land and water already in production, how to do so is in itself a matter of research." & "how better to translate science into productivity change in Africa is an important area of research itself."

[7] IWYP incorporates research themes and results from its CIMMYT-led predecessor, the Wheat Yield Consortium.

Table 4: Gender mainstreaming and gender-responsive institutional and capacity strengthening per FP

Flagship Project 2015-16	**Gender mainstreaming to improve gender responsiveness of WHEAT R4D**	**Gender-responsive institutional and capacity strengthening**
1 Maximizing value for money and social inclusivity through prioritization of WHEAT R4D investments	○ Build on the Gender Audit and South Asia scoping study, implement guidelines for gender-responsive development of wheat-based systems implemented in South Asia. ○ Systematic sex-disaggregation and gender analysis of people-level data sets	○ Collaboration with alternative partners with comparative advantage on gender in specific wheat contexts who can contribute on strategic and integrative gender research ○ South Asia resident gender research capacity
2 Novel diversity to adapt to climate change and resource constraints	○ Supportive actions to involve more female talent in the generation and application of cutting edge wheat technologies	○ Strengthen feed-back mechanisms captured by FP1, FP3, and FP5 from women and men farmers as part of surveys, impact studies and innovation platform approaches
3 Global partnership to accelerate genetic gain in farmers field	○ Research on wheat lines with traits of specific interest to particular groups (e.g. specific quality traits) and subsequent stacking of traits for combinations that address specific needs and preferences	○ Strengthen feed-back mechanisms captured by FP1, FP3, and FP5 from women and men farmers as part of surveys, impact studies and innovation platform approaches
4 Sustainable intensification of wheat-based cropping systems	○ Identify interventions that positively influence women's workload, health, access to resources and know-how and their role in decision-making ○ Gender relevant systems analysis tools and participatory methods are tested at local innovation platforms ○ Learn how traditionally male-dominated technologies (e.g. mechanization) interact with the social context and gender norms	○ Women farmers and entrepreneurs are understood as a core clientele with distinct needs and social capital by knowledge, input, and service providers ○ WEHAT partners and collaborators embed these insights into their business models and training programs ○ Social networks catalysed by civil society and self-help groups are leveraged for involving more women farmers
5 Human and institutional capacities for seed systems and scale-out	○ Develop scaling-out processes based on solid understanding of gender opportunities and constraints and how to strengthen women's agency (define goal and act upon) ○ Support actions to train and involve more female talent in variety selection, seed production, as innovation platform leaders, and informants to nationally-led projects	○ Promote gender-responsive processes and empowerment in national projects ○ Increase the proportion of female participation in international and regional training courses