

## ISPC Commentary on the WHEAT Phase-II – Preproposal (2017-2022)

### *Summary*

The WHEAT preproposal is well written, coherent and strategically relevant. It argues convincingly for further investment in wheat research, aiming for an agri-food systems approach that incorporates socioeconomic and political dimensions, innovation and change processes, to tackle major challenges to increasing wheat productivity in developing countries. The initial effort for moving from a commodity-based to an agri-food system CRP is to be commended, and WHEAT has put a lot of thought into the relevance of the system approach for specific activities and flagships (e.g. sustainable intensification). The main scientific arguments underpinning the rationale of WHEAT include germplasm research, sustainable intensification; and use of information systems and ‘Big Open Data’, cutting across five flagships. WHEAT intends to incorporate some Dryland Systems R4D priorities and approaches, and the proposers argue that more research is needed on the dynamics, actors and interactions of locally embedded, sustainable innovations systems. However more clarity and details will be needed on the components of the ongoing Drylands Systems CRP that will be integrated into WHEAT and how this will be implemented. The overall Theory of Change is consistent with the SRF; and WHEAT has indicated that priorities are still in the process of being aligned with IDOs and SLOs and ToC workshops are ongoing for each FP.

**Recommendation:** The ISPC considers this preproposal **Satisfactory with adjustment**, and recommends inviting the proponents to submit a full proposal which takes account of the following substantive issues (elaborated upon in the subsequent commentary) or provides a justification for lack of change:

- Four WHEAT flagships (FP1, 2, 3 and 4) are satisfactory with some adjustment as per the detailed commentaries included below for each specific flagship.
- The flagship on scaling-up and out (FP5) needs to be substantially revised, to articulate clearly its theory of change and impact pathway, building on the expertise and comparative advantage of the proposers and a specific partnership strategy that would take the CRP outcomes to scale.
- Much more attention is needed by WHEAT to strengthen its gender strategy, and how it will address the problems facing youth in the wheat agri-food system and target regions.
- Clarity is needed on the respective roles and responsibilities of the flagship and CoA leaders and how they will interact with the Management Committee.

### **[Overall pre-proposal Score: B]**

#### **1. Overall analysis as an integral part of the CRP Portfolio [Score: B]**

Wheat provides 20% of protein and calories consumed worldwide and demand for wheat is projected to continue growing with population increases. The bulk of increased consumption is expected to occur in developing countries. Wheat production gains are now lagging behind demand, and wheat yield growth in farmers’ fields has plateaued in many regions, and may

continue stagnating due to groundwater drawdowns, climate change and the re-emergence of pathogens and pests. WHEAT aims to assist smallholders improve farming practices under more challenging environmental conditions and climate change. WHEAT also faces specific gender and social inclusion challenges in several of its main target regions. The CRP preproposal presents a compelling argument for further investment in wheat research to tackle the major challenges to increasing wheat productivity in developing countries. WHEAT will address 8 of the Grand Challenges, and the five interconnected WHEAT flagships address aspects of climate change and details of the linkages with CCAFS are well described in the pre-proposal (*Annex 13*).

The scientific arguments underpinning the rationale of the WHEAT pre-proposal are based on three major thrusts: germplasm research strategy; sustainable intensification; and Big Open Data, cutting across WHEAT FPs. The comparative advantage of WHEAT resides on its global expertise and high-quality research innovation, as noted in the first CGIAR Stakeholder Perceptions Survey cited in the pre-proposal. WHEAT involves more than 250 partners worldwide with an excellent track record. Details of WHEAT comparative advantage considering its “niche” in the SRF are given in Annex 3. The proposers state that “*Private sector incentives to invest in wheat are dampened by the self-pollinating nature of wheat...*”; however, multinationals and others in the private seed sector –particularly in the EU– invest in wheat [hybrid] breeding (and genetic engineering), and WHEAT could take advantage of partnership opportunities to translate some of this cutting edge research into outcomes for the benefits of resource-poor farmers. Although WHEAT does not specifically address added value directly, through its 3 major thrusts which cut across its 5 FPs; its well-integrated wheat program partnership between CIMMYT and ICARDA; and its large network of partnerships, this CRP offers more value than the sum of its parts. However, more work is needed to fully articulate the value added.

Lessons learned are duly noted in Flagships 2, 4 and 5 as well as for integrating gender analysis and research perspectives into the FPs. The proposal addresses most of the previous ISPC recommendations (review of extension proposal, 2014) including the need to incorporate the Germplasm strategy into the Theory of Change and to make more explicit links between the impact pathways, the IDOs and the FPs; the need to complete the definition of impacts and identification of CRP IDO targets and indicators; and to speed up gender mainstreaming in the CRP research work plan (also recommended by the IEA evaluation); and the need to document how the CRP is managing its partnership and major regional collaboration initiatives (descriptions of research partnership should include an analysis of motivations, needs, capabilities and working relationships). As recommended by the IEA evaluation, WHEAT still needs to further develop its partnership strategy.

WHEAT perspectives on site integration opportunities are described in a comprehensive matrix that covers all regions and many countries where WHEAT is active (*Annex 12*) but the pre-proposal does not elaborate further on this – except for FP1 relating to both PIM and CCAFS CRPs. It is not clear how many activities have already been agreed, and most of the investments seem to be from bilateral funds.

## **2. Theory of Change and Impact Pathway [Score: A]**

The WHEAT ToC will contribute to 14 sub-IDOs, 8 IDOs and all 3 SLOs. The ISPC review of the WHEAT Extension proposal (2014) recommended that the germplasm strategy for WHEAT needed to be integrated within the ToC and make more explicit links between the impact pathways, the IDOs and the Flagship Projects. The pre-proposal presents a diagram (Page 12) of the links between the germplasm strategy (FP2 and 3), the systems strategy (FP4) and the adoption and use strategy (FP5) which helps to explain how the program fits

together. The impact pathway diagrams for the CRP and for FPs 1, 2, 3 and 4 (Annex 5) also include description of the assumptions and risks, as well as interventions and outputs. The priority farming environments for WHEAT (Table 2) are in 15 upper middle-income countries, 11 are lower-middle income countries, 2 low-income countries and 5 least developed countries. Overall, the ToC is consistent with the SRF but further details are needed in the full proposal as was also noted by the IEA evaluation. WHEAT has responded that priorities are still in the process of being aligned with IDOs and SLOs which have been a moving target during 2012 to 2015 and ToC workshops are ongoing for each FP.

### **3. Cross-cutting themes**

Both the ISPC extension review and the IEA evaluation recommended the need for WHEAT to strengthen the development and implementation of its gender strategy. The preproposal provides details of gender researchable issues (*Annex 9*), establishing priorities for WHEAT Phase II and how gender will be operationalised in the research agenda. WHEAT demonstrates that more effort has been made by the CRP team to strengthen implementation of its gender strategy. But as stated in the pre-proposal (page 1), gender inequalities continue to restrict the efficacy of wheat-based farming systems because women are frequently key actors in production and processing, yet may have restricted input into decision-making on how to manage farm systems, let alone assess and respond to emerging challenges. WHEAT is presently engaged in building capacity and exploring its own ability to mainstream a gender perspective into its research programs. Apart from mentioning that age will be taken into account in gender research and analysis, the coverage of youth is still poor. There is fleeting reference to youth in the description of the activities under FP1. Much more attention is needed by WHEAT as to how it will address the problems facing youth in the agri-food system.

Some FPs acknowledge the enabling environment, and one Cluster of Activity (CoA 5.2) is dedicated to improve it for the adoption of sustainable intensification options. Capacity development for WHEAT is the main focus of two CoAs under FP5. Adoption of CapDev Framework is mentioned under specific FPs, but there does not appear to be a WHEAT capacity development strategy.

### **4. Budget**

WHEAT requests \$87 M for 2017 rising to \$102 M by 2022, with a minimum of \$41 M in W1&2 funding. More than 50% of the budget goes to genetic enhancement (FPs 2 and 3) – which remains the core of this agri-food system CRP–, while the FP on sustainable intensification of wheat-based farming systems will get 20% of the expected funding. Between 20 and 30% of the total WHEAT budget is for non-CGIAR research and development partners. The budget considers the importance of wheat for food security, well-documented returns on investment and marginal R&D investments by the private sector in developing countries. It also includes several wheat-based systems hubs formerly managed by the Dryland Systems CRP and investments in new opportunities which are listed. In addition, WHEAT has used W1&2 funding for leveraging bilateral funding and aligning bilateral projects better within the program strategies.

### **5. Governance and management [Score: A]**

WHEAT follows the recommendations of the Governance and Management Review of the CGIAR and made changes that were assessed further by the IEA review. WHEAT is overseen by the ISC, which supervises strategy and priority setting and implementation through the WHEAT director. The ISC is composed of eight voting members from all major wheat growing regions worldwide, who combine public and private sector expertise in

various scientific disciplines. A Director with a professional career in plant breeding but not in agri-food systems will lead this CRP. The FP (co-)leaders are only for the two main CGIAR centers researching on wheat while the leadership of some CoAs may be by non-CGIAR. Many staff involved in each CoA are known for their research track record on related subject areas. The pre-proposal does not include a partnership strategy per se but rather provides various statements about partnering and lists which partners are involved in each FP. The IEA evaluation concluded that the revised G&M structure and processes of WHEAT are suitable for effectively implementing WHEAT and facilitating increased programmatic collaboration between CIMMYT, ICARDA and other partners. However further clarity is needed on the roles and responsibilities of the FP and CoA leaders and how they will interact with the Management Committee.

***FP1- Enhancing WHEAT's R4D strategy for impact*** [Score: B]

This flagship focuses on investigating the complexity of wheat-food systems, their interconnections with environmental factors and the consequences of globalization. Its ToC relates 10 outcomes that contribute to 4 SRF sub-IDOs, namely, increased value capture by producers, increased capacity of partner organizations, improved capacity of women and youth to participate in decision-making, and increased capacity of beneficiaries to adopt research outputs. The impact pathway for FP1 appears to be supported by a list of interventions and outputs together with risks and assumptions. The proposers state that its strategic alignment with national and regional priorities will be validated through the GCARD3 process; hence the full proposal should provide more evidence of the alignment.

FP1 will pursue multidisciplinary approaches with a significant contribution from the social sciences; it will also explore merging and analysing “Big Data”, methodological advances, and bridge quantitative-qualitative divides. Open access of FP1 data is made operational through *Dataverse*. This FP was reorganized with the aim of facilitating organizational learning and to provide strengthened strategic focus vis-à-vis WHEAT phase I and to address concerns and recommendations of the recent IEA evaluation. The proposers claim that its comparative advantage resides in the lead by CGIAR centers researching on wheat that will provide an objective and neutral partnership platform with strategic partners. The FP leadership team includes known economists, policy experts, sustainable development and marketing experts as well as gender specialists from CIMMYT, ICARDA, ARIs and NARS. Resource scarcities make it increasingly critical to provide targeted evidence, feedback and lessons for research and policies. There is some evidence in the preproposal that lessons will be used in refining strategies and priorities, and for addressing impact pathway constraints through partnerships and capacity development when necessary for outcomes. Named partners and their roles are given for all FPs (*Table 3*) and their key contribution further described for each CoA.

The targets for capacity development of this FP are national partner scientists and decision makers, beneficiaries who will increase their capacity for innovation, and partner research organizations that will enhance institutional capacity. FP1 endorses the CapDev Framework advocacy for the capacity to learn, innovate and adapt along impact pathways. The proposers indicate that the enabling environment for WHEAT's impact will improve by increasing the capacity of partner organizations and beneficiaries. CoA 5.2 is solely dedicated to improve the enabling environment for adoption of sustainable intensification options.

The performance indicator matrix does not relate to outcomes but to sub-IDOs. This FP's proposed budget allocates the largest funding to research outcomes contributing to the sub-IDO “Increased value capture by producers”.

***FP2 - Novel diversity and tools for improving genetic gains and breeding efficiency*** [Score: B]

This flagship aims at developing and validating new tools and to characterize genetic diversity that is mainstreamed to enhance the efficiency of the breeding programs (FP3). Significant progress in tool development and mainstreaming has already been achieved during WHEAT Phase I. The ToC underlying FP2 and its four CoAs shows how outputs contribute to specific sub-IDOs on enhanced genetic gains, conservation and use of genetic resources, enhanced capacity to deal with climatic risks and extremes, and enhanced institutional capacity of partner organizations. The impact pathway for FP2 appears to be supported by a list of interventions and outputs together with risks and assumptions.

Examples of novelty and quality of the science within FP2 are described. The FP leadership team shows a track record but does not relate it to what they have achieved in WHEAT Phase I. The leadership team includes germplasm scientists, molecular biologists, geneticists, breeders, physiologists, plant biologists, cytogeneticists and data/ICT specialists from CIMMYT, ICARDA and ARIs. Major lessons from previous research are noted. However, the pre-proposal does not elaborate on what relevant research gaps are being addressed by FP2, based on the comparative advantage of the CGIAR and particularly the host center, e.g. inter alia, Seeds of Discovery, International Wheat Yield Partnership, Heat and Drought Wheat Improvement Consortium, Feed the Future Innovation Lab for Applied Wheat Genomics, the Durable Rust Resistance in Wheat, or the Genomics and Open source Breeding and Informatics Initiative. This FP depends significantly on partnering with ARIs and leading service providers that add value both on scientific contribution and to enhance the probability of impact. As recommended by the IEA evaluation (2015), better coordination of pre-breeding efforts is needed among existing FP2 projects and with FP3 breeding programs to ensure complementarities, synergies and lateral learning; and establishing inter-FP special trait teams would further increase the chances of success for this approach.

Gender, youth and social inclusion implications are involved for defining trait targets, which account for equity considerations. The proposers claim that capacity development is “at the heart” of this FP for co-development and learning, as well as during mainstreaming of successful tools.

The highest proposed funding will be equally given to outcomes related to sub-IDOs on enhanced genetic gains and conservation plus use of genetic resources, while the outcomes related to the sub-IDO on enhanced institutional capacity of partner research organizations receive half of that. Such budget distribution within FP seems to be appropriate.

***FP3- Better varieties reach farmers faster*** [Score: B]

This flagship’s primary outcomes relate to 5 SRF sub-IDOs, namely reduced production risk; reduced pre- and post-harvest losses including those caused by climate change and faster and higher genetic gains; enhanced capacity to deal with climatic risks and extremes; and technologies that reduce women’s’ labour and energy expenditure developed and disseminated; and also contributes to the sub-IDO related to increased availability of nutrient-rich foods via CRP A4NH. The impact pathway for FP3 appears feasible with a minor concern about seed systems (see below). It is supported by a comprehensive list of interventions and outputs together with risks and assumptions. It is noted that FP3 is linked to CoA 5.1 on seed systems; the link is important but the breeding research and the seed systems research are separated into two different FPs. Other CRPs e.g. RAFS and RTB have included them in the same FPs to keep the breeding pipeline and delivery integrated together.

The proposers do not elaborate on the need for research to account for potential unintended consequences on SLOs that are not the primary focus of FP3.

In FP3 scientific quality is addressed at CoA level, and each CoA includes a science quality section that gives examples of new and cutting edge science. The FP leadership team –which also include staff from NARS and ARIs-, has a track record in wheat genetics, breeding, phenotyping, molecular biology, plant pathologists, IPM, cereal quality and bioinformatics. However, this was not assessed on the basis of what was achieved in the previous CRP portfolio because this information was missing in the pre-proposal. The pre-proposal does not indicate clearly what lessons were learned from previous work and how this past learning helps in shaping this FP. FP3 is built on the comparative advantage in wheat breeding and genetics of the CGIAR Centers and partners involved. The range of partners from NARS, ARIs and the private sector is impressive; lists of partners are indicated under each CoA.

The proposers indicate that this FP3 will address gender by improving the nutritional value of wheat products, and reducing drudgery and field labour time, thus benefiting mostly women and young people. The enabling environment is duly noted for molecular breeding. This FP lacks a section on capacity development, which is nonetheless indicated briefly in various CoAs. It is assumed that some of this work will be done through bilateral projects.

The proposed funding gives priority to outcomes related to the sub-IDO on reduced production risks, and thereafter for sub-IDOs on reduced pre-/post-harvest losses including those caused by climate change, and enhanced genetic gains.

#### ***FP4- Sustainable intensification of wheat-based farming systems*** [Score: B]

This flagship aligns its design, structure, methodology, scientific human resources and strategic partnerships with ARIs with MAIZE flagship 4, as indicated by the proposers. The primary outcomes of FP4 relate to the sub-IDOs on efficient use of inputs, closed yield gaps and diversified and intensified agricultural systems, while addressing CGIAR cross-cutting issues through the relevant sub-IDOs. The ToC for this FP along with the target and beneficiary table show the relevance of its impact pathway. Although, the pre-proposal does not elaborate in depth on the degree of alignment of question or problem to be addressed by, and expected outputs from, this FP with national and regional priorities and initiatives, it indicates what critical productivity constraints will be tackled according to the geography. This FP assembled a leadership team with known track record on its main subject though it does not indicate if all of them participated in Phase I and what they achieved therein.

All key sustainable intensification interventions in the FP are considered within a systems analytical context. The CRP will incorporate some R4D priorities and approaches of the Dryland Systems CRP, using multi-scale innovation systems research, underpinned by a geospatial framework that includes biophysical and socioeconomic extrapolation domains, for trade-off analysis at different scales to better target and prioritize interventions. As argued by the proposers, more research is also needed on the dynamics, actors and interactions of locally embedded, sustainable innovation systems. However the proposers need to provide more clarity and details on the components of the ongoing Dryland Systems CRP that will be integrated into WHEAT and how and where this will be implemented (target areas). The proposers should also elaborate in depth on how this FP fills relevant research gaps, and what are the comparative advantages of the CGIAR –particularly the CRP host center– in sustainable intensification of wheat-based farming systems. Sustainable intensification is considered very important in the context of climate change. The proposed docking of WHEAT FP4 with CCAFS will be articulated around research activities including participatory evaluation technologies and practices in Climate Smart Villages; improved

resource use efficiency, particularly nitrogen and water; creation of minimum datasets for climate smart technologies and Big Data. However, these activities and links with the Big Data platform should be clearly specified in the full proposal.

The proposed budget gives priority funding to outcomes related to sub-IDs on efficient use of inputs, closed yield gaps, and diversified and intensified agricultural systems. The proposers have almost doubled the funding for outcomes related to sub-IDs on enhanced capacity to deal with climate risks and extremes, improved capacity of women and young people in decision-making, and increased capacity of beneficiaries to adopt research outputs –whose budget is also twice the size of the outcomes related to sub-IDs on enhanced institutional capacity of partner research organization and particularly for engaging in innovation.

#### ***FP5 - Scaling-up and out*** [Score: C]

The flagship does not present a separate ToC and lacks an impact pathway diagram because according to proposers its outcomes are mapped in a number of theories of change included in WHEAT. The performance matrix allows identifying the related sub-IDs to its outcomes. The alignment of question or problem to be addressed, and the ensuing expected outputs, with national and regional priorities and initiatives is not clear.

Much of the science input to FP5 is in CoA 5.1 on seed systems. The science focus relates to novel approaches for the use of business model analyses, upgrading strategies after identifying performance constraints and critical success factors, relying on GIS for various tasks and on ICT to scale up agricultural technologies and improved processes, adopting approaches that incorporate farmer feedback loops to researchers, and pursuing qualitative methods to measure management and effectiveness of scaling up. Technical backstopping by GIZ expertise will be important. The leadership team includes breeders, seed systems experts, capacity building expertise and private seed sector experience. On paper the team appears to be weak for the task in hand and should be strengthened through key strategic partnerships. FP5 will benefit from collaboration with GIZ to facilitate WHEAT's scaling-out partnership building, to take validated systems approaches, germplasm- and sustainable intensification-based technologies to scale. However, more clarity will be needed on the nature of this partnership and the way it will be implemented across WHEAT target areas.

The comparative advantage of the CGIAR centers, according to the proposers, is their long history on capacity building. Named partners and their key contribution(s) are given in tables for CoAs 1 and 3, but missing in CoA 5.2. Gender and youth are given priority for scaling-up by reinforcing the understanding of the adoption, adaptation and scaling- up processes. More details are needed in the proposal on how this will be achieved.

The largest proposed budget goes equally to outcomes contributing to sub-IDs on enhanced institutional capacity of partner research organization and increased capacity for innovation in partner research organizations, which is almost double the proposed funding for outcomes related to sub-IDO on increased capacity of beneficiaries to adopt research outputs, and treble the amounts proposed for both enhanced genetic gains and improved capacity of women and young people to participate in decision-making.

#### **Recommendations**

- More clarity required on the alignment of the research with national and regional priorities
- More clarity required on the nature of the proposed partnership with GIZ

- More detail required on how scaling up will take account of gender and youth issues