



**RESEARCH
PROGRAM ON
Maize**



MAIZE- AFS CRP Plan of Work and Budget (POWB) for 2018

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MAIZE-AFS CRP Plan of Work and Budget (POWB)

COVER PAGE

Name of the CRP: MAIZE AFS- CRP

Name of the Lead Center: CIMMYT

List of participating Centers and other key partners: IITA, ICAR (India), IDS (UK), KIT (NL), DArT (AU), JHI (UK), Monsanto, Pioneer, KALRO (Kenya), NARO (Uganda) and WUR (NL)

1. Expected Key Results

1.1 Adjustments/ Changes to Your Theories of Change:

The MAIZE Theory of Change remains as stated in POWB2017, after submission of MAIZE Phase II proposal and after the System Council decision to follow ISPC advice to drop Flagship 5. The ToC shows how MAIZE will contribute to delivering on the CGIAR's 2016-30 Strategy and Results Framework (SRF) (see Annex 1).

1.2 Expected CRP Progress Towards Intermediate Outcomes and SLOs: *[Please provide a short narrative of highlights of the CRP expected in 2018: for instance, Key innovations or intermediate outcomes? Cross-cutting areas? Please use bullets where possible. Please complete [Table A: Planned Milestones](#). *Note that these summaries will be shared publicly in any system-level synthesis of plans for publication in 2018.]*

Along the breeding research-to-farmer adoption pipeline, improve the efficiency of maize doubled haploid (DH) technology, provide a greater number (compared to previous year) of breeder-ready markers/high-value haplotypes for prioritized traits and faster replacement rates for multiple stress tolerant MAIZE hybrids (with MLN resistance) in Eastern Africa.

Increased adoption of combinations of Sustainable Intensification strategies, resource and labour-saving technologies in specific target geographies, compared to 2017, also by applying a scaling navigation tool.

Greater capacity for, and innovation in, ex ante and ex post impact assessment, to foster learning about innovation pathways and scaling approaches, also based on improved indicators and metrics for multi-level assessment of SI of maize based systems

Develop a multi-year, demand-driven strategy for 'maize and nutrition' to prioritize researchable issues and develop new partnerships.

1.3 Obtaining Evidence on Relevant Outcomes and Impacts: *[Please provide a short narrative for any outcome case studies, impact assessment or adoption studies planned in 2018 that are expected to provide evidence on key links between relevant research outputs, outcomes and long-term impacts. This may include relevant planned studies by others, e.g. SPIA or external partners. Please complete [Table B: Planned Studies for Relevant Outcomes and Impacts.](#)]*

MAIZE will fund a number of foresight, ex ante, impact and adoption studies, also via the MAIZE Partner Budget, such as:

The MAIZE Global variety release and adoption impact study will document NARS', NGO/CSO and ARI partners' use of improved CGIAR maize germplasm. It will demonstrate the economic benefits generated by CGIAR-funded maize improvement research. This study will show the return on investment of IAR4D on CGIAR maize pre-/breeding R4D for developing countries. See Table B for more details.

1.4 Plans by CRP Flagships: *[Please summarize the plans for each flagship in 2018, including any plans for new directions or partnerships, and identifying any areas of work that are being discontinued. If major changes have been made to a flagship since the CRP proposal was published, please annex a brief summary of the current flagship program with the updated theory of change.]*

Key MAIZE 2018 outputs per Flagship are:

FP1:

- Comparative analysis of 8 MAIZE GENNOVATE case-studies (Nigeria, Tanzania) and quantitative gender analysis capacity building.
- Synthesis of previous foresight studies as input for priority setting for MAIZE.
- Study on Implications of technological, environmental and dietary changes in MAIZE; research on current and potential uses of remote sensing in adoption and impact studies.
- Comparative analysis of thematic areas to strengthen or expand into, e.g. political economy, nutrition, remote sensing.

FP2:

- New version of a forward-facing data warehouse with IP-compliant, cross-project data storage and query capabilities for easier scientist access.
- Provide data migration, curation support and software training for a new enterprise breeding system and associated tools for maize scientists.
- Provide data standard development, and database user support towards ensuring FAIR sharing of MAIZE data.
- Develop novel diversity for maize lethal necrosis (MLN) resistance, by applying gene editing
- Study of the changes in genetic composition after several cycles of Genomic Selection.

FP3:

- A maize Double Haploid facility established in India that can serve NARS and SME seed companies in South Asia.
- Development of third-generation MLN tolerant hybrids with drought tolerance, yield potential and other relevant agronomic and adaptive traits.
- Breeding for native trait-based resistance to Fall Armyworm (FAW).
- Increasing germplasm diversity, yield potential, stress tolerance, input use efficiency and agronomic architecture of tropical maize through temperate germplasm introgression.
- Breeding for resistance to key diseases (PFSR, BLSB, TLB, DM, Polysora Rust).

FP4:

- Methodological contribution to impact assessment and better targeting of Sustainable Intensification (SI) interventions in SSA, capitalizing on data collected by IITA, WUR, CIMMYT in a range of projects (N2Africa, TAMASA, SIMLESA, Africa Rising,...); continued collaboration with ORNL and IIASA on modelling and indicators for sustainable intensification impacts.
- APSIM modeling to simulate performance of new maize varieties under a range of nutrient management and climate conditions.
- Develop and test scaling out/up approaches, including a navigation tool, in ongoing and new projects.
- Develop a MAIZE Regional research strategy (including RM) through the articulation of country- and region-specific R4D programming and partnership priorities.

1.5. Cross Cutting Dimensions

1.5.1 Gender, Youth and Capacity Development: *[Please briefly summarize the main areas of work in 2018 relevant to cross-cutting dimensions. Indicate FP number in parenthesis if relevant. Please complete [Table C: Cross-cutting Aspect of Expected Outputs.](#)]*

In 2018 MAIZE will continue to address gender disparities in maize-based systems:

MAIZE will deploy W1&2 to catalyze the integration of gender R4D within the flagships by realizing: 1) thematic gender studies e.g. in Sustainable Intensification/mechanization, 2) framework of monitoring gender integration in the MAIZE project portfolio, 3) compiling lessons from qualitative research on gender under GENNOVATE to better understand how gender norms and agency influence the ability of men, women and youth to try out, adopt and adapt new agricultural technologies.

The STMA project (Stress tolerant Maize for Africa), which is engaged in 12 countries across Eastern, West and Southern Africa, will work on enhancing capacity of seed companies to target women and men and strengthening gender capacity for support to seed companies and agro-dealers, by conducting studies in at least four countries to determine the impacts the gender trainings had on providing services to the farmers. STMA will also carry out studies to build knowledge on gender in seed value chains.

DTMASS Project (Drought- Tolerant Maize for Africa- Scaling Seed) will tailor marketing to gender demands and preferences within local+ maize seed markets and will strengthen the capacity of farmers by conducting gender responsive training. FP1 will develop a study on integration of social inclusion and gender dimension into scaling activities.

The SIMLESA project (Sustainable Intensification of Maize-legume cropping Systems for Food Security on Eastern and Southern Africa) under MAIZE will continue its Gender and Value Chains analysis for maize and legumes, by developing case studies per country and publishing findings from the studies that assessed the benefits for Agricultural Innovation Platforms (AIPs) and gender equity in Ethiopia, Kenya, Mozambique and Tanzania. MAIZE will fund a publication on interests and perceptions about agriculture among African rural youth, using data that collected from Ethiopia, Kenya, Mozambique and Tanzania.

MAIZE continues to implement its MAIZE Capacity Development strategy by 1) providing training in key areas in collaboration with leading universities, NARES, private sector, and advanced research institutes, etc. 2) supporting a culture of learning and collaboration through the implementation of the Learning Management System (LMS; co- funded by WHEAT under MAIZE), 3) fund seminars, learning events, workshops and projects that develop knowledge and learning resources across MAIZE Flagship projects.

1.5.2 Open Data and Intellectual Assets: *[Please highlight any specific plans you have to move forward in these areas in 2018.]*

A forward-facing data warehouse with IP-compliant, cross-project data storage and query capabilities will make CGIAR germplasm data more readily available (equity in access) in a structured, query-able and IP-sensitive manner. Apart from enhanced scientist access, the warehouse makes possible re-purposing of existing data for scientific and development advances (50% co-funding from WHEAT).

In the (pre-)breeding domain, developed donors, QTLs, genes and gene-based markers for different traits are shared openly after publication in journals with all participating institutes as well as NARS institutions. Developed breeding lines are shared freely with public sector organization for evaluation

and release. All reports and analyzed data for multi-location evaluation are also published openly. The MAIZE centers use existing SMTA and customized MTA for germplasm exchange.

The repositories currently used in MAIZE are summarized below:

Name	Repository Technology	URL	FAIR compliant?
CIMMYT Institutional Multimedia Publications Repository	DSpace	http://repository.cimmyt.org/	Yes
CIMMYT Institutional Research Data and Software Repository	Dataverse	http://data.cimmyt.org/	Yes
IITA Knowledge	Non-specific	http://www.iita.org/knowledge	Not yet

2. Planning for CRP Effectiveness and Efficiency

2.1 CRP Staffing in 2018: *[Please briefly summarize staffing, and any constraints or other consideration relevant to CRP capacity. Please complete [Table D: CRP Staffing.](#)]*

MAIZE is looking to enhance efficiency and impact, by working with a new generation of scientists and other professionals guiding national agricultural research across the developing world, as well as working in partnership with CGIAR, the private sector, policy makers and other stakeholders.

2017 staffing levels at both Centers will be maintained. In Table D, MAIZE shows the number of staff delivering W1&2- and/or bilaterally funded projects under this CRP. Exact FTE calculations are not possible, as some scientists also deliver research under other CRPs and we cannot track all scientists (e.g. national staff hired at CIMMYT country office locations) working only on bilateral projects.

2.2 Financial Plan for 2018, including use of W1/2: *[Briefly highlight any important issues regarding the financial plan and highlight any particularly interesting plans for the use of W1/2 in 2018. Please Indicate FP number in parenthesis, if relevant. Please complete [Table E: CRP Planned Budget](#), and [F: Main Areas of W1/2 Expenditure.](#)]*

MAIZE-MC agreed to follow SMB advice and budget with 85% (\$9.520 M) of SC-endorsed 2018 allocation (\$11.2 M). MAIZE-MC intends to deploy all carry-over from 2017 during 2018.

W1&2 funding constitutes <20% of the overall MAIZE budget and catalyzes impact, through strategic and complementary investments along the whole impact pathway, from upstream research to downstream development of business models and multi-stakeholder partnerships for innovation and scaling out. W1&2 investments cover both the research and product development component of the impact pathway, as well as the strengthening of the enabling environment, e.g. through capacity development and partnership building. The long-term nature of W1&2 funding provides continuity and therefore guarantees not only short-term impacts, derived from bilateral projects, but also long-term impacts on 5-10 year time scales. Most W1&2 funds are used to support a) proof-of-concept work; b) seed investment on emerging research priorities leading to funding of W3/bilateral projects; c) cross-project learning and building new strategic partnerships for scaling, and for better understanding scaling processes; d) MAIZE management functions: planning & MEL; coordination among implementing centers and partners; open access and open data management; intellectual assets management; communications; knowledge management and capacity development.

2.3 Collaboration and Integration

2.3.1 New Key External Partnerships: *[Please describe expected collaboration with key external partners and any relevant outputs, outcomes and progress towards impact, focusing on results that could not have been produced without such alliances and insisting on the give and take value for your CRP. Please complete [Table G: List of New Key External Partnerships.](#)]*

- Proximal- and remote-sensing based phenotyping and yield component analysis in maize breeding, with AGRITEX.
- Exploring incorporation of gender-responsive traits in maize breeding and seed systems in ESA, with Zvitambo Institute for Maternal and Child Health Research, Zimbabwe.
- Establish a double haploid facility for South Asia, with ICAR (new project with long-time partner).
- Developing salinity tolerant maize germplasm for South Asia, with ICBA and other partners.

2.3.2 New Contribution to and from Platforms: *[Please describe expected services, collaborative research or studies, materials that would be required from each of the CGIAR Platforms (Big Data, Excellence in Breeding, Genebank, and Gender) to support the implementation of the CRP's POWB for 2018, and an indication of the source of the budget where possible (e.g. CRP, Platform, Joint, other). Please complete [Table G1: New Internal \(CGIAR\) Collaborations among Programs and between the Program and Platforms.](#)]*

The Genebanks Platform and MAIZE shall continue to collaborate on the following topics: Genotyping of germplasm collections, data visualization and enhanced access to molecular data. MAIZE aims to engage more with the Genebanks Platform's Policy module.

Under the Inspire module of the Big Data Platform, CIMMYT will co-implement two projects, one of which is very relevant to MAIZE (Alise Dykstra & David Guerena | IVR (Interactive Voice Response) Marketing Service | VOTO Mobile & CIMMYT). Under the Organize module, the aim is to make it easier for others to understand and use MAIZE-funded research data (Open Access, FAIR = Findable, Accessible, Interoperable, and Reusable sharing). MAIZE invests its W1&2 funding in data migration and curation support, data standards, database user support and scientist software training.

Both CIMMYT and IITA have assigned some W1&2 funds to enable collaboration with EiB with regard to Marker-assisted and Genomic Selection, Genetic Gains assessments and generating economics of scale with low- and high-throughput genotyping/sequencing providers.

2.3.3 New Cross-CRP Interactions: *[Please describe what is expected to be done through new collaborations with other CRPs and any relevant outputs, outcomes and progress towards impact, focusing on results that could not have been produced without such alliances and including the "give and take values" for your CRP. Please complete [Table G2: New Internal \(CGIAR\) Collaborations among Programs and between Programs and Platforms.](#)]*

MAIZE aims to design new collaborations with WLE and A4NH, as well as with all other AFS-CRPs on full-purpose crops and either start implementing or jointly fundraising during 2018. Planning for collaborations with the Big Data and EiB Platforms started in 2017 and are executed in 2018.

2.3.4 Expected Efforts on Country Coordination: *[Please describe expected efforts related to the CGIAR country coordination initiative in 2018. How will the CRP engage with CGIAR's country coordination and in which countries? What are the priority themes for coordination and how will this work be funded?]*

MAIZE will particularly focus on eight countries (Bangladesh, D.R.Congo, India, Kenya, Nepal, Nigeria, Tanzania, and Zambia), and will explore: **1)** how internal CGIAR communications and planning can be improved to identify opportunities for cross-CRP synergies; **2)** how joint engagement with national stakeholders and alignment with national priorities can be enhanced; and **3)** how coordination, cooperation and leveraging between ongoing MAIZE W3/bilateral projects and those of other CRPs operating in the selected countries can be improved.

During the June CRP Leaders Meeting, MAIZE intends to support bottom-up, low-cost efforts at moving forward Country Collaboration forward within a few countries (less than 5).

2.4 Monitoring, Evaluation, and Learning: *[Please highlight any areas of interest for evaluation, review or learning event planned in 2018, and complete [Table H: Planned Monitoring, Evaluation, and Learning Exercises.](#)]*

- MAIZE will continue to play an active role in the cross-CGIAR system Monitoring, Evaluation and Learning Community of Practice to share challenges and best practices, and streamline the MEL work across the system.
- MAIZE is centralizing planning, monitoring and reporting information for the CRP in the MARLO platform (Managing Agricultural Research for Learning and Outcomes). This will allow MAIZE to more strongly link individual projects and areas of research to 2022 outcomes and the MAIZE impact pathway, as well as more easily plan and budget its work, monitor research progress, and report on CRP results on an annual basis.
- Notwithstanding budget restrictions, MAIZE will commission an evaluation of FP2: Novel Tools and Diversity, which will be performed jointly with IITA and WHEAT. This is part of the Phase-II Rolling Evaluation Plan as described in the MAIZE Phase II Proposal.
- MAIZE has a small centre of expertise dedicated to strengthening project management, and will continue to build capacity in terms of project management, which includes project-level monitoring, evaluation and learning. The CRP is encouraging project leaders and scientists to use new IT tools that will help them to manage their day-to-day activities, and to attend internal trainings to strengthen their project management skills.
- MAIZE will review and reflect on FP theories of change at the end of 2018 based on performance data collected and lessons learned, and best practices will be documented. This exercise will inform planning, prioritization and decision making for the next year.

3. CRP Management

3.1 Management of Risks to Your CRP: *[Please highlight any major risks for 2018.]*

In 2018, MAIZE management risk assessment is related to the delivery of results. Three major risks to manage are: **1)** W1&W2 budget insecurity and delayed transfer of W1&2 funds, which directly affects CRP research and development operations; **2)** unfulfilled obligations by the partners for commissioned and competitive grants; **3)** lack of a systematic and integrated approach for monitoring and evaluation at the output and outcome levels. To mitigate risk **(1)**, the MAIZE Management Committee continues to give high priority to multi-year investments of centers and partners, and is careful in issuing of new partner grants through the W1&2 budget. MAIZE will continue signing only one-year partner grant contracts, to manage partner expectations and to minimize any possible delays of payments to partners. For risk **(2)**, MAIZE will monitor the fulfillment of obligations by partners and intervene when necessary to ensure proper completion of grant requirements. As for risk **(3)**, MAIZE will adopt the results-based management framework developed by CCAFS and use it by all integrating CRPs and a number of agri-food system CRPs. The Managing Agricultural Research for Learning and Outcomes (MARLO) Platform will support CRP- and FP-level planning, monitoring, reporting and evaluation needs. Work is ongoing to ensure a smooth transition to the MARLO system.

3.2 CRP Management and Governance: *[Please briefly describe any important changes in governance or management expected in 2018, if any.]*

The MAIZE-Management Committee (MAIZE-MC) changed its membership composition to include all FP Leaders from CIMMYT and IITA responsible for day-to-day management of the CRP, besides representatives of the lead center providing key inputs/advice.

MAIZE- ISC will change membership in 2018 assuring adequate representation per target world regions. Mike Robinson, representative from Syngenta, has accepted the role of Chair and will work in conjunction with the CRP Director to attract new members.

To better manage W1&2 volatility and achieve efficiency gains, the CRP's Management Unit (CRPs-PMU) has been restructured. MAIZE and WHEAT share one CRP Program Manager. Both CRP-Management Committees will review the restructuring by July 2018.

TABLES

Table A: Planned Milestones [Please include the planned milestones mapped to FP, sub-IDO and 2022 outcomes. Please indicate how W1/2 funding will be used vis-à-vis W3/bilateral]

FP	Mapped and contributing to Sub-IDO	2022 CRP outcomes (from proposal)	Milestone*	Budget		Assess of risk to achieve ** (L/M/H)	Means of verification
				W1/2	W3/bil.		
1	C.1.1 Increased capacity of beneficiaries to adopt research outputs	1.8	MAIZE AFS studies completed in relation to: 1. Foresight and targeting; 2. Adoption and impact; 3. Gender and social inclusiveness; and 4. Markets and value chain opportunities.	1,146,237	3,330,521	Low	Supporting publications: Reports/journal papers
2	1.4.3 Enhanced genetic gain	2.4	Greater number (compared to previous year) of breeder-ready markers/high-value haplotypes for prioritized traits identified and validated (under FP2) and deployed in MAIZE breeding programs (FP3)	667,837	5,466,327	Low	Marker deployment tracking; tool use tracking
	1.4.3	2.5	Improved efficiency of maize doubled haploid (DH) technology	853,756		Low	Documented technologies, pipeline tracking, genomic selection models
	D.1.3 Increased capacity for innovations in partner research organizations	3.1	Donor germplasm with desirable stover quality, kernel carotenoid stability and processing properties identified and shared with partners in target countries.	37,911		Low	Open access databases; publications; reports; annual MAIZE germplasm shipments to public and private sector partners in SSA, LA and Asia;
	D.1.3	3.3	Multiple stress tolerant MAIZE hybrids (with MLN resistance) replace at least 5 dominant but 15+ year old maize varieties in MLN-endemic countries in eastern Africa; At least 20% yield advantage under heat stress in Stage 4 hybrids cohort relative to popular commercial hybrids grown in the spring season in South Asia.	242,716		Low	Diversity Allele distributed via new varieties (genetic studies); % legally and physically available accessions in the CIMMYT, IITA maize banks; breeder use tracking
3	1.4.3	2.4	Greater number (compared to previous year) of breeder-ready markers/high-value haplotypes for prioritized traits identified and validated (under FP2) and deployed in MAIZE breeding programs (FP3)	236,673	26,028,765	Low	Marker deployment tracking; tool use tracking
	1.4.3	2.5	Improved efficiency of maize doubled haploid (DH) technology	415,244		Low	Documented technologies, pipeline tracking, genomic selection models
	D.1.3	3.1	Donor germplasm with desirable stover quality, kernel carotenoid stability and processing properties identified and shared with partners in target countries.	972,978		Low	# improved nutritious MAIZE varieties released by seed enterprises/NARS

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	1.4.1 Reduced pre- and post-harvest losses, including those caused by climate change	3.2	Sustainable early-generation seed (breeder, pre-basic, and foundation seed) supply systems promoted, especially in SSA; Deployment of a new seed system management software in regional hubs, linked to institutional phenotypic and genotypic databases, to streamline inventory management, routine QC/QA operations, phytosanitary regulation compliance, and shipment tracking.	149,071		Low	# MAIZE varieties commercialized by partners in SSA, Asia and LA; Documentation of old and obsolete maize varieties replaced by seed companies with improved MAIZE hybrids; Variety adoption monitoring reports; Training materials, and list of participants of MAIZE training courses; Surveys, literature review, and qualitative data.
	D.1.3	3.3	Multiple stress tolerant MAIZE hybrids (with MLN resistance) replace at least 5 dominant but 15+ year old maize varieties in MLN-endemic countries in eastern Africa; At least 20% yield advantage under heat stress in Stage 4 hybrids cohort relative to popular commercial hybrids grown in the spring season in South Asia.	569,979		Low	Diversity Allele distributed via new varieties (genetic studies); % legally and physically available accessions in the CIMMYT, IITA maize banks; breeder use tracking
	1.4.2 Closed yield gaps	3.4	Seed production studies across a range of target seed production environments in collaboration with public/private sector partners; Research into the economics of seed production of single-cross and three-way cross hybrids in SSA.	1,027,919		Low	Online information on seed production information packages of MAIZE parental lines and hybrids; Reduced cost of goods sold (COGS); Surveys
	2.1.1 Increased availability of diverse nutrient-rich foods	3.9	Donor germplasm with desirable stover quality, kernel carotenoid stability and processing properties identified and shared with partners in target countries.	231,057		Low	# improved nutritious MAIZE varieties released by seed enterprises/NARS
	1.4.1 Reduced pre & post-harvest loss, incl. those caused by climate change, 1.1.2 Reduced production risk	3.10	Seed production studies across a range of target seed production environments in collaboration with public/private sector partners; Research into the economics of seed production of single-cross and three-way cross	146,825		Low	Online information on seed production information packages of MAIZE parental lines and hybrids; Reduced cost of goods sold (COGS); Surveys; Reports
4	D.1.1. Enhanced institutional capacity of partner research organizations	4.4	for 2019 : Better understand and model relationship between commercialization / market-oriented production and diversification / productivity increases, for scaling-up purposes, e.g. consider input and output markets	165,203		Low	partner self-assessments
	C.1.1	4.6	Better understand scaling up processes in multi-actor innovation networks, to ensure sustainability of institutional mechanisms, structures	191,482		Low	Reports, case study documentation, significant change stories, management options and ICT systems

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1.4.5 increased access to productive assets, including natural resources	4.9	increased adoption of combinations of SI strategies, technologies in specific target geographies compared to previous year	383,375		Low	Reports, case studies, materials, dissemination documentation, tools
1.4.2 Closed yield gaps through improved agronomic and animal husbandry practices	4.10	Increased adoption of combinations of SI strategies, resource and labour-saving technologies in specific target geographies compared to 2 016	669,493		Low	Reports, case studies, materials, dissemination documentation, tools

* Milestones include both outputs, output use and outcomes along the impact pathways as appropriate to the scale and maturity of the work.

In this table A, please focus as much as possible on significant milestones towards outcomes which can be justified the completion at reporting.

**Please list the major risks focusing more on technical or geographic considerations that may hinder the expected delivery of results by the CRP.

Table B: Planned Studies for Relevant Outcomes and Impacts [Please complete the following table to share any outcome case studies, impact assessment or adoption studies planned. Please indicate relevant sub-IDOs, and provide links to long-term expected outcomes and impacts, if appropriate. Mention any cross-cutting dimensions explicitly, if any.]

Planned topic of study	Geographic scope	Relevant to Sub-IDO, or SRF target if appropriate	Comments
Synthesis of previous foresight studies as input in conducting priority setting for MAIZE AFS	Global, all MAIZE target areas	C.1.1	Identify foresight gaps
Ex ante case study on intensification pathways via surface water irrigation of farming systems	Southern Bangla.	C.1.1	Relates to remote-sensing based targeting tool
Complete study of global impact of CGIAR maize germplasm (e.g. variety release and adoption) & report on meta-analysis of maize adoption and impacts	Global	1.4.1	
Position paper on current and potential uses of remote sensing in adoption and impact studies	Global	C.1.1	Identify need for innovation, feasibility of new IA methods
Scoping study to assess impacts of Sustainable intensification in heterogeneous maize production systems.	India	C.1.1	
Report on adoption and impact of improved maize	Benin, Ghana	1.4.1	
Conduct study on improving financial inclusion of smallholder farmers in Nigeria		1.3.1	Enabling conditions for sustainable adoption
Analysis of labour impacts, field level impacts SI uptake and environmental impacts of crop residue retention promotion	Malawi	B.1.2	
Rethinking adoption and adoption research	Global	C.1.1	conceptual framework; compilation of primary and secondary field data
Improved indicators and metrics for multi-level assessment of SI of maize based systems	SSA, S Asia (India)	1.3.4	Refined impact assessment framework tested; peer-reviewed publications
Develop and apply a navigation tool to assess and integrate essential scaling up/out principles in projects; lessons learned on scaling integrated in the design of new projects		1.3.4	Training, publication

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Validate APSIM model to simulate performance of new maize varieties under a range of nutrient management and climate conditions; simulate the response of maize to nitrogen, phosphorus, planting date under different climatic and soil conditions	Central, West Africa	A.1.4	Publication, guidelines to better target, increase chances of adoption
Couple crop simulation modeling with remote sensing models to explore the impacts on ecosystem services of maize-legume cropping systems; assess yield & economic benefits of innovative approaches addressing the pigeon pea component in maize-based cropping system	Central, West Africa	3.2.2	Ex ante, better targeting, recommended germplasm
Define recommendation domains for Africa RISING validated technologies in West Africa; build partnerships for dissemination; survey adoption		3.2.2	
On-Farm Evaluation of Stress Tolerant Maize Varieties in Southern Africa	Southern Africa		To increase adoption of Climate Smart Technologies
Leasing of agricultural machinery	Ethiopia		The study on leasing scheme will help the ministry of agriculture and the development bank of Ethiopia for their recently approved leasing program for agricultural machinery.
Achieving Impact through Complementary Stress-resistant Seed & Financial Technologies	??		Uses randomized control trials (RCTs) to assess the impact through stress-resistant seeds and financial technologies
Nutrient Management RCT			using TAMASA Panel Survey households to test if credit and /or insurance increases uptake of and investment in nutrients

Table C: Cross-cutting Aspect of Expected Outputs [Please present expected total overall number of outputs, and % of outputs with principal (scored 2), significant (scored 1), and not targeted (scored 0), for gender, youth and capacity development.]

Cross-cutting	Number (%) scored 2 (Principal)	Number (%) scored 1 (significant)	Number (%) scored 0	Total overall number of outputs
Gender	6%	33%	61%	158
Youth	4%	36%	61%	
CapDev	17%	55%	28%	

Table D: CRP Staffing [Please fill in the table for 2018 CRP staffing.]

Category	Female (FTE*)	Male (FTE)	Total FTE	% female (FTE)
<i>Program director & flagship leaders</i>	2	7	9	22%
<i>Principal Investigators</i>	5	21	26	19%
<i>Other Senior Scientists (not PIs)</i>	6	49	55	11%
<i>Post-docs / junior scientists</i>	3	7	7	43%
<i>Research fellows</i>				
<i>Other science support staff</i>				
TOTAL CRP	16	84	97	

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*FTE= Full Time Equivalent

Caveats: 1) MAIZE counts # of CIMMYT and IITA staff, not FTE's, as the same staff perform different roles, e.g. FP leader and Principal Investigator; 1FTE may spend 20% on the former and 80% on the later. FP Leaders also engaged in other CRPs, making assignment of FTE% more complicated. 2) Staff are funded to different degrees by W1&2 versus Bilateral. Not all scientists working only on bilateral projects under MAIZE are counted. 3) External (non-CGIAR) MAIZE- MC and MAIZE- ISC members are not counted. 4) Science support staff are not counted, as they support CIMMYT's and IITA's participation in several CRPs.

Table E: CRP Planned Budget [Please fill the table based on the planned CRP budget for 2018.]

	Planned budget 2018			Comments on major changes
	W1/2	W3/bilateral	Total	
FP1	1,146,236	3,330,521	4,476,757	
FP2	1,812,220	5,466,327	7,278,547	
FP3	3,749,747	26,028,765	29,778,512	
FP4	1,409,552	22,190,797	23,600,349	
Strategic Competitive Research grant	992,459	0	992,459	Partner grants not incorporated in FP budgets
CRP Management & Support Cost	1,000,000	0	1,000,000	
CRP Total	10,110,214	57,016,410	67,126,624	Total new 2018 W1&2 income estimated 9,519M (85% of SC-endorsed)

	2018	
	SMB Approved (100%)	M-MC 85%
CRP		
Management	1,000,442	1,000,442
IITA	2,822,921	1,760,808
CIMMYT	6,586,815	5,968,926
Partners	789,823	789,823
Total	11,200,000	9,519,999

Table F: Main Areas of W1/2 Expenditure

Expenditure area *	Estimated percentage of total W1/2 funding in 2018**	Space for your comments [please remove notes below]
Planned research: principal or sole funding source	60%	<p>Synthesis of previous foresight studies as input in conducting priority setting for MAIZE AFS.</p> <p>Improve genetic gain by increasing population size and selection intensity through deployment of cost-effective markers for major diseases.</p> <p>Study of the changes in genetic composition after several cycles of genome selection. Improve algorithm for GS predictive models. High throughput phenotyping, genetic evaluation of new traits.</p> <p>Explore and identify new approaches to repurpose and extract additional value from germplasm bank accession data</p> <p>Increasing germplasm diversity, yield potential, stress tolerance, input use efficiency and agronomic architecture of tropical maize through temperate germplasm introgression including genomic, passport, GIS and phenotypic resources.</p> <p>Breeding for cold stress tolerance in Asia-adapted maize germplasm; develop fall armyworm resistant lines</p> <p>Integration of technological and institutional options in rural livelihood systems</p>
Planned research: Leveraging W3/bilateral funding	10%	<p>Improved productivity of new stress tolerant products under MLN disease pressure (contribution to STMA project)</p> <p>Improved germplasm with at least 25% temperate origin will be contributed to bilateral projects STMA, WEMA/TELA, MLN, Fall Army worm-related projects.</p> <p>White and yellow hybrids pipeline (MasAgro): Expand evaluation network to key countries in Central and South America, for a better sampling of target environments in the lowland tropics of LAC, including for TSC in white hybrids, high yield potential in yellow hybrids, high Zn.</p> <p>Enabling and decision support tools, which are key in germplasm development.</p>
Catalyzing new research areas	15%	<p>Development of third-generation MLN tolerant hybrids with drought tolerance, yield potential and other relevant agronomic and adaptive traits.</p> <p>Breeding for native trait-based resistance to Fall Armyworm.</p> <p>Proximal- and remote-sensing based phenotyping and yield component analysis in maize breeding.</p>
Gender	10%	<p>Exploring incorporation of gender-responsive traits in maize breeding and seed systems in ESA.</p> <p>Forming Cooperatives of maize landrace-conserving smallholders from marginalized communities in Mexico to enable sustainable connections to culinary markets.</p> <p>Mechanization of maize based systems in Sub-Saharan Africa.</p>
Youth	5%	<p>Extending MAIZE Regional Trial and Germplasm Testing Network to NARS and SME partners in selected non-STMA countries.</p> <p>QPM germplasm support to partners in East and Southern Africa.</p>

MAIZE – 2018 Plan of Work and Budget (POWB)

Capacity development	15%	Learning Management System (LMS) rolled out at IITA, ICARDA.
Start-up or maintenance of partnerships (internal or external)	Not able to be extracted	Forming Cooperatives of maize landrace-conserving smallholders from marginalized communities in Mexico to enable sustainable connections to culinary markets. Conduct hands-on (and on-site) training workshop on crop modeling.
Monitoring, learning and self-evaluation	Already included in the categories above	Gaining insights on farmers' decision-making related to sustainable intensification: An ex ante case study on intensification pathways via surface water irrigation of farming systems in Southern Bangladesh.
Evaluation studies and Impact Assessment studies	5%	Global MAIZE germplasm impact assessment. Meta-analysis of maize Adoption/impact assessment. DNA fingerprinting of varieties in farmers' fields in Nigeria.
Emergency/contingency	0%	MAIZE-MC approved a 2018 W1&2 budget at 85% of System Council-endorsed. The 15% difference acts as contingency.
Other	0%	
TOTAL FUNDING (AMOUNT)	11,200,000	

*use these categories wherever possible, delete unneeded rows and add rows if none of these are suitable.

**we recognize that (i) some funding may fit more than one category but please try to apportion funding to its principal use and (ii) percentages may not add up to 100%

Table G1: List of New Key External Partnerships [Please list up to five new most relevant partnerships for 2018 for each flagship, using the following table. An agreed list of partners' types and areas of partnerships will be provided in the common results indicators manual (available early 2018).]

FP	Stage of research*	Name of partner	Partner type*	Main area of partnership*
FP1	Phase 1: Discovery/Proof of concept	IDS	Academic and Research	Rethinking adoption in MAIZE: Position paper for field-based investigation of MAIZE related technological change processes.
FP1	Phase 3/4: Scaling up and scaling out	KIT	Academic and Research	Gender competency framework roll-out Phase II Quantitative Analysis
FP2	Phase 1: Discovery/Proof of concept	IBP, DArT and JHI	Academic and Research	database management, medium-density GBS, and breeding informatics
FP2	Phase 2: Piloting	Monsanto, Pioneer	Private Sector	Maize transgenic testing under CFTs and stewardship implementation
FP3	Phase 2: Piloting	KALRO, ARC and NARO	Development organizations (NGOs, networks and regional organizations)	maize transgenic testing and elite germplasm for product development
FP4	Phase 3/4: Scaling up and scaling out	WUR	Academic and Research	systems frameworks and quantitative analysis at landscape scale

* See instructions in the common results indicators manual (available early 2018).

Table G2: New Internal (CGIAR) Collaborations among Programs and between the Program and Platforms [Please list up to five most relevant new internal collaborations for 2018 among programs, and programs and platforms, using the following table.]

Name of CRP or Platform	Brief description of collaboration (give and take among CRPs) and value added*	Relevant FP
PIM, Big Data, WHEAT, CCAFS	Coordination and building foresight portfolio for MAIZE AFS & synthesis of previous foresight studies as input in conducting priority setting for MAIZE AFS	FP1
PIM	Quantify effects of dietary change on the future demand for major cereals - case study for Africa	FP1
Big Data	Provide data curation, data standard development, and database user support towards ensuring FAIR sharing of MAIZE data.	FP2
EIB, Big Data	Continuous improvement of analytical tools, for GS, GWAS and genotypic data analysis. Integrate META-R Spatial META-R and SI with decision tools. Prototype breeding decision support tool for application of genomic selection; Study of the changes in genetic composition after several cycles of genome selection.	FP2
CCAFS	Exploring incorporation of gender-responsive traits in maize breeding and seed systems in ESA	FP3
EIB, A4NH	Development and testing of elite biotic and abiotic stress tolerant maize germplasm in lowland tropics of Latin America	FP3
Scaling CoP Across CRPs	Give access to relevant information on scaling approaches appropriate to MAIZE based farming systems	FP4

*e.g. scientific or efficiency benefits

Table H: Planned Monitoring, Evaluation, and Learning Exercises [Status of planned evaluations, impact assessments and other learning exercises for 2018.]

Planned studies/learning exercises in 2018	Comments
Multi-criteria analysis in maize agronomy: Workshop and paper development	This deliverable is dependent on the allocation of required funding and as such is still to be formally determined; review progress of multi-criteria assessments of cropping systems in the tropics, develop recommendations for minimum data standards, produce review paper. Cross-regional meeting, review of status and issues associated with multi-criteria cropping system assessments, needs identification on how to increase NARES use of multi-criteria assessments, minimum data needs. Cross-regional and integrative R4D to assess global agronomic science needs for the tropics; not typically covered in bilateral projects.
Leveraging biological diversity to improve maize productivity and nutritional outcomes	This deliverable is dependent on the allocation of required funding and as such is still to be formally determined; review will address the following questions: What are the benefits of biologically diverse maize-based rotations for smallholders? What options reliably boost cropping intensity and contribute to high yields and profits unit area ⁻¹ time ⁻¹ ? What role do relay and intercroops with nutritious leafy vegetables and dual-purpose legumes have in the context of increasingly land-scarce smallholder agriculture? Cross-regional meeting, literature review, research framework and report (feasibility study). Extension materials developed with NARS for biologically diverse and intensive maize-based cropping systems.
Strategic research expansion, partner engagement and resource mobilization plan (South East Asia, SEA)	Further IDO and sub-IDO details to be identified in 2018/19 based on country visits, partner consultations, and strategic plan development. We expect alignment with the RICE CRP and potentially with Forests, Trees and Agroforestry, WLE and/or Livestock.
Evaluation of FP2: Novel Tools and Diversity	performed jointly with WHEAT

Annex 1: MAIZE AFS Theory of Change

