AMENDMENT NO. 1 TO THE CONSORTIUM PERFORMANCE AGREEMENT
UNDER THE CGIAR FUND (TF 069018)
FOR CRP 3.2 – Maize – Global Alliance for Improving Food Security and the
Livelihoods of the Resource-poor in the Developing World

WHEREAS a Consortium Performance Agreement (as may be amended from time to time, the “CPA”) was entered into on 17 November 2011 by the Fund Council of the CGIAR Fund (the “Fund Council”), represented by the International Bank for Reconstruction and Development (the “World Bank”), and the International Plant Genetic Resources Institute (operating under the name of Bioversity International, hereafter referred to as “Bioversity”), on behalf of the Consortium of International Agricultural Research Centers (the “Consortium”) (the Consortium together with the Fund Council are collectively referred to as the “Parties”) under the Joint Agreement between the Fund Council and the Consortium dated April 15, 2011 (the “Joint Agreement”); and

WHEREAS the CPA is for the CGIAR Research Program entitled “Maize – Global Alliance for Improving Food Security and the Livelihoods of the Resource-poor in the Developing World” (the “CRP”), which the Parties have agreed to modify in accordance with the 2014 Program of Work and Budget attached hereto as Exhibit A (the “Revised Terms”) that was submitted by the Consortium to the Fund Council and approved by the Fund Council on 8 May 2014, as recorded in agreed minutes of the Fund Council attached hereto as Exhibit B (the “Supplemental Fund Council Approval”);

NOW THEREFORE, the Parties hereto agree to modify the CPA as follows:

1. Based on the Supplemental Fund Council Approval and as set forth in the Revised Terms, the total amount of funds from Window 1 and Window 2 of the CGIAR Fund that may be transferred to the Lead Center as part of the CRP is US$ 51,055,000 (the Fund Council-Allocated Component), and the Total Budget for the CRP is US$ 225,846,000, all in accordance with the following table:

<table>
<thead>
<tr>
<th></th>
<th>Amount previously approved</th>
<th>Additional amount approved</th>
<th>Total amount approved under this Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 1 &amp; 2</td>
<td>44,700</td>
<td>6,355</td>
<td>51,055</td>
</tr>
<tr>
<td>Windows 3 &amp; Bilateral</td>
<td>193,100</td>
<td></td>
<td>174,791</td>
</tr>
<tr>
<td>Total</td>
<td>237,800</td>
<td>6,355</td>
<td>225,846</td>
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The Consortium agrees, and shall require the Lead Center for the CRP, and through such Lead Center any other Centers or Partners participating in such CRP, to agree that the amounts above and any investment income specified under Section 10.2 of the Joint Agreement will be used only for the purposes described in Exhibit 1 to the original CPA as modified by the Revised Terms in Exhibit A to this Amendment and will be governed by the terms and conditions of the Joint Agreement, which is incorporated by reference herein, and the terms and conditions of the CPA.

For clarity, the Parties acknowledge that in response to various Fund Council requests, additions to the Common Operational Framework, development of the Strategy and Results Framework and other aspects accepted by the Fund Council, and as presented through progress reports, annual financing plans and other updates from the Consortium, the specific terms of the original CPA have adjusted over time.

For further clarity, the term for implementation of the CRP is extended through December 31, 2014.
2. The offices responsible for the Consortium, Fund Council, Fund Office and Trustee for coordination of all relevant matters related to the implementation of the CPA and this Amendment, including providing or being provided any notice, taking any action and executing any documents required or permitted pursuant to the CPA and this Amendment, are, except as may be notified in writing to the other Contact:

For the Consortium (the “Consortium Contact”):
Chief Executive Officer
CGIAR Consortium
1000 avenue Agropolis
34394 Montpellier cedex 5
FRANCE
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Fax: + 33 (0)4 67 04 75 83

For the Trustee (the “Trustee Contact”)
Director
Concessional Finance and Global Partnerships
The World Bank
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For the Fund Council (the “Fund Council Contact”)
Chair of the CGIAR Fund Council
Group Vice President and Special Envoy, Climate Change
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For the Fund Office (the “Fund Office Contact”):
Executive Secretary, CGIAR Fund Council and
Head, CGIAR Fund Office
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3. All other terms and conditions of the CPA shall remain in full force and effect as written.

4. The Consortium consents to the disclosure of this Amendment and related information in accordance with the World Bank’s policy on disclosure of information.
5. This Amendment will come into effect retroactively as of 1 July 2014 once signed by the duly authorized representatives of both Parties. The World Bank is signing this Amendment solely in its capacity as signatory for the Fund Council as the Fund Council does not have legal personality, and not in its capacity as Trustee, Fund Office or in any other role, except as otherwise provided herein.

THE FUND COUNCIL, by the International Bank for Reconstruction and Development

Rachel Kyte
Group Vice President and Special Envoy, Climate Change

Date 6 August 2014

THE INTERNATIONAL PLANT GENETIC RESOURCES INSTITUTE, on behalf of the Consortium

Ann Tutwiler
Director General

Date 26 August 2014
A. Narrative of major planned work (2 pages/1000 words maximum)

The MAIZE CRP has been reorganized into five coherent Flagship Projects.

Flagship Project 1, Sustainable intensification and income opportunities for the poor:

- Innovate, develop and promote sustainable intensification in maize-based systems in Africa (Eastern, Southern, Western and Central), Asia and Latin America. Identify gender sensitive approaches and scale out lessons relevant for climate change adaptation through the CRP on Climate Change, Agriculture and Food Security. Strengthen the use of ICT-based and cell phone mediated precision agriculture approaches for small-holder farmers (especially women) in Latin America and Asia, as a precursor for establishing similar approaches in Africa.

- Undertake modelling and soci-economic studies to improve targeting of interventions and better understand adoption pathways & impacts related to sustainable intensification interventions. Undertake gender analysis of nutrient management in smallholder maize-based systems. Integrate gender in research design. Coordinate gender targeting and mainstreaming during ‘product’ discovery, validation and scale-out. Identify interventions that positively influence women’s workload, health, access to resources and know-how. Proactively include women farmers in field days and feed back to researchers. Collect and analyse gender disaggregated data and actively recruitment women enumerators and supervisors for adoption surveys.

Flagship Project 2: Novel tools and traits to increase genetic gains in maize

- Enhance maize breeding gains by exploring, and making available the full native genetic diversity of maize, though an international partnership that draws on cutting-edge genomics capacities in Mexico, Australia, the U.K. and the US for the benefit of international agricultural R4D. Geno- & phenotyping of genetic resources for identification of materials with traits of specific interest to particular client groups (e.g. specific quality or stress tolerance traits), including traits for which female farmers have voiced their preference within the activities of other Flagship Projects.

- Develop molecular tools for maize breeding. Proactively include women professionals in training. Utilise Doubled Haploid technology to increase the accuracy, and reduce the time and cost, of breeding new maize lines/varieties. In collaboration with the Generation Challenge Program, develop better bio-informatic tools for breeders and; Promote open access to germplasm data. Discuss gender-aware data dissemination strategies and gender-based impact assessment methods with gender specialists. Emphasis is on traits favored by women and affecting the poorest: DT, herbicide resistance, NUE.

Flagship Project 3: Stress tolerant, nutritious and safe maize for resource-poor farmers

- Continue with the development and deployment of maize with tolerance to drought, acidic soils, nutrient use efficiency, post-harvest and Striga resistance, traits that are particularly valued by the poor and women. Aggressively pursue maize with Maize Lethal Necrosis Resistance, a newly emerging disease that is devastating maize production and livelihoods in Africa. Proactive inclusion of female farmers and disadvantaged groups in trait prioritization, variety feedback (eg MBTs, NMVTs, and field days), awareness campaigns (field days, sample packs). Initiate integrative research on gender as a customer attribute. Actively recruit women field staff, enumerators and supervisors for ‘farmer-level’ activities, wherever possible, taking into account their special needs. Promote gender aware approaches among local teams and partners.

- Enhance maize traits that contribute to enhanced nutrition especially among women and children, in particular high lysine maize and high Vitamin A maize, in collaboration with CRP Agriculture Nutrition & Health. Based on user demand, enhance traits that contribute to enhanced feed and industrial user quality. Develop participatory variety selection strategies which target specifically women and young adults. Dissemination information targeting individuals (both women and men) rather than household heads. Create awareness throughout product development and delivery, with the support of health extensionists.

Flagship Project 4: Aligning with and strengthening local seed systems
• Improve maize seed delivery and adoption through improved public/private seed system partnerships with emerging local seed companies in Africa, Asia and Latin America, with special attention on engaging women farmers in awareness raising, the production of OPVs and providing feedback to new varieties. Initiate integrated OPV & hybrid development strategy. Include women in all research stages: discovery (trait prioritization), validation (NVMT, MBTs), and scale up (field days, seed packs). Sensitize seed companies and NARES in gender-appropriate demonstrations and field days. Collect gender disaggregated adoption data in areas where improved maize seed has been promoted. Conduct research to better understand what constitute barriers for people's (female, male) ability to take up and benefit from improved technologies. Inclusion of female farmers and disadvantaged groups in trait prioritization, validation and seed production. Document level and type of outcomes, and impact and draw lessons for feeding back into the R4D process. Include diverse germplasm, OPVs, improved landraces, local materials improved for important local regional stresses. Involvement of farm families in field days for preferences, uses and marketability.

• Undertake modelling and soci-economic studies to improve targeting of seed interventions and better understand adoption pathways & impacts related seed and grain innovations.

Flagship Project 5, Integrated postharvest management:

• Reduce losses and improve safety through improved maize grain storage and bio-control of aflatoxins in Africa and Latin America. Proactively engage women as well as men in the awareness of post-harvest solutions that improve household food security and incomes. Conduct research to better understand what constitute barriers for people's (female, male) ability to take up and benefit from improved technologies. Promote gender aware approaches among local teams and partners.

Flagship Project 1 Sustainable Intensification and income opportunities for the poor will contribute to two important Intermediate Development Outcomes: IDO1 Increased productivity and stability of farming systems and IDO2 increased income of small holder farmers. Flagship Project 2, 3 and 4 Maize varieties – Stress tolerant, Nutritious and Safe will lead to three important Intermediate Development Outcomes: IDO2 Increased income of small holder farmers; IDO3: Increased yields of maize for smallholder farmers, and; IDO4: Increased nutritional diet. Flagship Project 5, Integrated postharvest management will lead to two important Intermediate Development Outcomes: IDO5 Reduced post-harvest losses, and; IDO6: Reduced aflatoxin in maize value chain.

Changes to original 2014 W1&2-funded workplan are as follows:

• IEA-led evaluation of MAIZE during 2014

• Greater emphasis on Maize Lethal Necrosis Resistance, a newly emerging disease that is devastating maize production and livelihoods in Africa.

• Significant political risk that the Mexican government will no longer fund the Seeds of Discovery project (SeeD; CA 2.1.). Mexico is practically the sole donor, as part of its MasAgro engagement.

• Emphasizing gender across a broader range of Flagship Projects.

Preliminary comments regarding the Tables

Budget figures in Tables 1 and 2 below are best estimates as of January 2014 and do not reflect all pipeline projects. Before any formal approval of the POWBs and 2014 CRP funding by Consortium Board or Fund Council, the budget figures must be updated in April 2014, based on formal budget predictions, as per the agreed Consortium financial reporting calendar.

WHEAT and MAIZE have adapted and piloted UNDP- tried and tested DAC gender markers in this 2014 POWB. The DAC gender marker approach to monitoring gender mainstreaming progress and gender budgeting has been taken on in many multilateral organisations (see Annex 1, p.25). We appreciate the guidance and support by the Consortium Senior Advisor on Gender in accessing information and guidelines around the implementation of the DAC gender marker approach. We propose that more CRPs start using gender markers based on multi-year experiences from other organizations, instead of each of us reinventing the wheel. Once lessons have been learnt, the methodology can easily be refined Consortium-wide. The level of organization within the the CRP has been revised. The original 9 Strategic Initiatives have been consolidated to create 5 Flagship Projects. Key activities within the Flagship Projects have been reviewed by the MAIZE Management Committee and organized in 21 Cluster of Activities (labeled as x.x). They will be further reviewed and input sought from partners as we move towards the Extension Phase (2015 – 2016) and the 2nd phase of the CRP. B. Tables - See next pages.
Table 1 - Planned key activities for 2014 to produce IDOs and outputs, with associated planned budgets

<table>
<thead>
<tr>
<th>FOR REFERENCE ONLY</th>
<th>Level of organisation within the CRP</th>
<th>Description of planned key activities at each level of internal organisation</th>
<th>Expected results of planned key activities</th>
<th>Planned budget ($ 000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3: Flagship Project, and Level 4: outcomes</td>
<td>1: Sustainable intensification and income opportunities for the poor (Regional and national)</td>
<td>Supported by cutting edge modelling and socio-economic studies, that improve targeting of interventions and a better understanding of adoption pathways &amp; impacts, Flagship Project 1 aims to: a) Promote sustainable intensification in maize-based systems in selected target areas of Africa (Eastern, Southern, Western and Central), Asia and Latin America; b) Identify gender sensitive approaches and scale out lessons relevant for climate change adaptation through the CRP on Climate Change, Agriculture and Food Security, and; c) Strengthen the use of precision agriculture approaches for small-holder farmers (especially women) in Latin America and Asia, as a precursor for establishing similar approaches in Africa. Gender dimension: Coordinate gender targeting and mainstreaming during ‘product’ discovery, validation and scale-out. Identify interventions that positively influence women’s workload, health, access to resources, know-how and value-chains. Proactively include women farmers in field days and feed back to researchers. Collect and analyse gender disaggregated data and actively recruitment women enumerators and supervisors for adoption surveys.</td>
<td>Working in partnership with farmers, private sector, NARES, and NGOs, our R4D undertaken in discrete Cluster Activities contribute to two of the program’s six IDOs: IDO 1 Increased productivity and stability of farming systems and IDO 2 Increased income of small holder farmers. In conjunction with the Consortium Office, Key Performance Indicators (KPIs) for the IDOs will be developed in 2014.</td>
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<td>2: Novel tools and traits to increase genetic gains in maize (Global)</td>
<td>Flagship Project 2 aims to: a) Enhance maize breeding gains by exploring, and making available the full native genetic diversity of maize, though an international partnership that draws on cutting-edge genomics capacities in Mexico, Australia, the U.K. and the US for the benefit of international agricultural R4D; b) Geno- &amp; phenotyping of genetic resources for identification of materials with traits of specific interest to particular client groups (e.g. specific quality or stress tolerance traits), including traits for which female farmers have voiced their preference; c) Develop molecular and phenotyping tools for maize breeding; d) In collaboration with the Generation Challenge Program, develop better bio-informatic tools for breeders, and; e) Promote open access to germplasm data.</td>
<td>Working in partnership with ARIs, SME seed companies, and NARES, our R4D undertaken in discrete Cluster Activities contribute to two of the program’s IDOs: IDO 3 Increased yields of maize for smallholder farmers, and; IDO 4 Increased nutritional diet. In conjunction with the Consortium Office, Key Performance Indicators (KPIs).</td>
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<td>3: Stress tolerant, nutritious and safe maize for resource-poor farmers (Regional)</td>
<td>Supported by cutting edge modelling and soci-economic studies to improve targeting of seed interventions and better understand adoption pathways &amp; impacts related seed and grain innovations, Flagship Project 3 aims to: a) Develop and deploy high performing maize varieties with tolerance to drought, acidic soils, nutrient use efficiency, post-harvest and Striga resistance - traits that are particularly valued by the poor and women; b) Aggressively pursue maize with Maize Lethal Necrosis Resistance, a newly emerging disease that is devastating maize production and livelihoods in Africa, and; c) Enhance maize traits that contribute to enhanced nutrition especially among women and children, in particular high lysine maize and high Vitamin A maize, in collaboration with CRP Agriculture Nutrition &amp; Health.</td>
<td>Working in partnership with SME seed companies, NARES, and NGOs, our R4D undertaken in discrete Cluster Activities contribute to three of the program’s IDOs: IDO 2 Increased income of smallholder farmers; IDO 3 Increased yields of maize for smallholder farmers, and; IDO 4 Increased nutritional diet. In conjunction with the Consortium Office, Key Performance Indicators (KPIs) for the IDOs will be developed in 2014.</td>
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<tr>
<td>4: Aligning with and strengthening local seed systems (Regional &amp; National)</td>
<td>Supported by cutting edge modelling and soci-economic studies to improve targeting of seed interventions and better understand adoption pathways &amp; impacts related seed and grain innovations, Flagship Project 4 aims to: a) Improve maize seed delivery and adoption through improved public/private seed system partnerships with emerging local seed companies in Africa, Asia and Latin America, with special attention on engaging women farmers in awareness raising, the production of OPVs and providing feedback to new varieties.</td>
<td>Working in partnership with SME seed companies, NARES, and NGOs, our R4D undertaken in discrete Cluster Activities contribute to three of the program’s IDOs: IDO 2 Increased income of smallholder farmers; IDO 3 Increased yields of maize for smallholder farmers, and; IDO 4 Increased nutritional diet. In conjunction with the Consortium Office, Key Performance Indicators (KPIs) for the IDOs will be developed in 2014.</td>
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Integrated Flagship Project 5 aims to reduce losses and improve food safety through improved maize grain storage and bio-control of aflatoxins in Africa and Latin America. Working in partnership with farmers, private sector, NARES, and NGOs, our R4D undertaken in discrete Cluster Activities contribute to two of the program’s six IDOs: IDO 5 Reduced post-harvest losses, and; IDO6: Reduced aflatoxin in maize value chain. In conjunction with the Consortium Office, Key Performance Indicators (KPIs) for the IDOs will be developed in 2014.

<table>
<thead>
<tr>
<th>Level 5: Outputs</th>
<th>Level n-2: Cluster of activities&lt;sup&gt;1&lt;/sup&gt;</th>
<th>For each Cluster of activities, indicate:</th>
<th>Expected outputs (results of discovery and proof of concept phases of R&amp;D, see Annex 1) and research outcomes (results of pilot phase of R&amp;D, see Annex 1)</th>
<th>Budget per Cluster of activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP1 Sustainable intensification</td>
<td>1. Adoption pathways &amp; impacts - sustainable intensification</td>
<td>1.1. Build a functional innovation system “infrastructure”, while simultaneously building on-the-</td>
<td>Key Outputs in 2014: a) MAIZE innovation system infrastructure strengthened and at least 10 NARS and other partners trained (including advanced training) in agricultural innovation systems approaches and facilitation of multi-stakeholder interaction mechanisms (including innovation platforms); b) Innovation systems</td>
<td>Windows 1&amp;2 = 0 Windows 3 &amp; Bilateral = 1,418</td>
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</tbody>
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<sup>1</sup> Clusters of activities are designed by the CRP and there should be around 5 Clusters per Flagship
and income opportunities for the poor

thinking and methodologies implemented with NARS and partners in at least 5 hubs; c) Gender integrated into research design and implementation, and; d) Interventions that positively influence women’s workload, health, access to resources and know-how identified.

Key Outputs in 2014: a) Institutional innovations for improving farmers’ cost-effective and timely access to maize technologies, input markets and services analysed; b) Technology adoption analysed, and; c) Interventions that positively influence women’s workload, health, access to resources and know-how identified.

Key Outputs in 2014: a) Pro-poor policy options and strategies that stimulate technology adoption, diffusion, and inclusiveness of women and marginal farmers documented in peer-reviewed journal article; b) Knowledge on adoption and gender differentiated impacts of maize technologies in maize-based farming systems in Africa, Asia and Latin America documented in peer-reviewed journal article, and; c) Options for systems intensification and diversification that reduce risk in the ten farming systems analysed using systems modeling.

Key Outputs in 2014: a) Ex-ante impact assessment of alternative pathways for sustainable intensification in Mexico, Ethiopia, Kenya and Nepal documented in peer-reviewed journal article.

1.2. Promote sustainable intensification in Africa

Key Outputs in 2014: a) Performance of maize following promiscuous soybean and cowpea varieties and nitrogen benefits to maize quantified and documented in peer-reviewed journal article; b) Ten to 15 stress tolerant maize varieties and 10 higher yielding legume varieties disseminated to farmers; c) Farm-household risk reducing and productivity enhancing options identified for ten farming systems; d) Interventions that positively influence women’s workload, health, access to resources and know-how identified, and; e) Women farmers proactively included

<table>
<thead>
<tr>
<th>Key Outputs in 2014:</th>
<th>Windows 1&amp;2 =1,413</th>
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<td></td>
<td>Windows 3 &amp; Bilateral = 8,386</td>
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POWB Template
Key Outcomes in 2014: a) More than 1000 small-holder farmers in Zambia adopt soybean in maize-based systems that reduce the need for synthetic nitrogen fertilizer; b) Capacity built to better understand maize-legume interactions and more than 1000 small-holder farmers adopt soybean and/or cowpeas in maize-based Conservation Agriculture systems in Mozambique.

Key Outcomes in 2014: At least 40,000 small-holder farmers and 30 extensionists using recommendations for nitrogen fertilizer for maize grown after legumes in Ghana and Nigeria.

Key Outputs in 2014: a) More than 50 NARS and other partners trained in modelling, participatory evaluation, crop improvement, cropping systems, technology targeting and VCA – Eastern and Southern Africa; b) More than 100 extension workers in Ghana and Nigeria trained in use of fertilizer decision support tools.

Key Outcomes in 2014: a) Use of decision support tools scaled out to more than 100 extensionists in Northern Ghana and Northern Nigeria.

1.2.2. Develop options for integrated management of nutrients in the maize production systems of West Africa.

1.2.3. Build local capacity in NARS and other partners to support sustainable intensification of maize-based farming systems.

1.3.1. Test, develop and promote productive, resilient and sustainable smallholder maize-rice-wheat cropping systems and innovation systems for local scaling out in collaboration with the WHEAT and GrisP CRPs.

1.3. Promote sustainable intensification in Asia

Key Outputs in 2014 - Development of innovations: a) Prioritized production and livestock feed technology, tested and improved in at least 10 communities for different regions, farmer groups, and women; b) Soil map developed for major maize growing regions, and; c) Business models targeting men and women entrepreneurs developed for sustaining change through private enterprise and investment.

Key Outcomes in 2014 - Scale-out of technologies: a) Production and post-harvest technologies adopted by more than 1000 small-holder farmers; b) Web and mobile-based apps to aid decision-making by men and women farmers adopted by more than 50,000 small-holder farmers; c) Dissemination pathways for agricultural knowledge and technologies using traditional approaches and ICTs strengthened and diversified; d) Breeders in national programmes have access to at least 10 improved maize varieties possessing high yield, improved agronomic, grain, and stover fodder quality traits suited to crop-livestock systems; e) Best crop management technologies (including Nitrogen & Phosphorus) adopted by at least...
1.3.2. Build local capacity in NARS and other partners to support sustainable intensification of maize-based farming systems.

Key Outputs in 2014: a) Agriculture Innovation Systems (AIS) mainstreamed as organizing template for hub management implementation; b) Strategies to overcome gender-diff causes of post-harvest cereal losses in each hub developed; c) Strategies to overcome constraints to farmer adopt of production, feed, and post-harvest technologies developed; and; d) Primary impact pathways to provide a road map for production and livestock feed technologies defined.

1.4. Promote sustainable intensification in Latin America

1.4.1. Undertake innovation network analysis for improved technology delivery and outscaling in maize-based systems – Mexico.

Key Outcomes in 2014: a) Integration of the maize value chains actors' better understood and strengthened for all innovation hubs, and; b) Extension system developed and integrated into all innovation hubs.

1.4.2. Test and develop productive, resilient and sustainable smallholder maize-based cropping systems and innovation systems for local scaling out – Mexico.

Key Outcomes in 2014: a) Three prototype post-harvest storage technologies developed; b) More than 3 post-harvest technologies tested across all innovation hubs; c) 35 Post-harvest trials conducted with basic grain producers in 7 innovation hubs, and d) Precision Agriculture approaches developed and tested in more than 5 innovation hubs.

1.5. Strengthen the use of precision agriculture for smallholder farmers in Latin America and Asia

1.5.1. Identify and characterize major drivers of change in maize based systems in order to better target information and needs of smallholder precision agriculture - Mexico, East and Southern Africa, Nepal, and Bangladesh.

Key Outcomes in 2014: a) Priority setting and recommendation domains for targeted system change interventions and common methodologies on data gathering and database management established for selected agro-ecologies, and; b) Gender sensitive study on smallholder nutrient management in maize-based systems conducted.

1.5.2. Identify biomass management constraints and implications for adoption of CA practices in mixed crop livestock systems - Mexico, East and

Key Outcomes in 2014: a) Strategies to alleviate pressure on biomass use in order to optimize the CA systems through sufficient mulching identified through a decision support system, and; b) Interventions that positively influence women's workload, health, access to resources and know-how identified.
### Southern Africa, Laos, Ethiopia, Nepal.

**1.6. Coordinate gender targeting and mainstreaming**

1.6.1. Ensure project appropriate level of gender focus in R4D on Maize-based systems and in institutional processes - Global.

Please see description in the Gender Section.

| FP2 2: Novel tools and traits to increase genetic gains in maize | Key Outputs in 2014: a) Population level genetic fingerprints from 13,000 accessions and 1000 lines generated using Genotyping by Sequencing (GbS); b) 20,000 accessions and line fingerprints (to identify genomic motifs that respond to human and environmental selection) analysed, and c) Areas of maize genetic space which has not passed the breeding bottleneck and is not present in improved lines identified. | Windows 1&2 = 0  
Windows 3 & Bilateral = 0 |
|---|---|---|
| 2.1. Enhance maize breeding gains through quantitative genetics and better utilizing the full native genetic diversity of maize | Key Outputs in 2014: a) Data generated from the SeeD GWAS panel to identify markers and haplotypes which may contribute to enhanced performance, nutritional quality and stress tolerance in the field analysed, and; b) GWAS panel for specific traits to validate and improve the power of marker and haplotype identification augmentive phenotyped. | Windows 1&2 = 766  
Windows 3 & Bilateral = 7,110 |
| 2.1.1. Explore the genetic variation present in the international maize genebank collection using cutting edge next generation technologies and identify those areas of the maize genetic space which did not make it through the bottleneck of the development of modern breeding lines. | Key Outputs in 2014: a) Drought tolerance of a panel of more than 500 high value landraces which originate from stress prone environments phenotypically evaluated. | |
| 2.1.2. Through targeted phenotyping and genomic analysis identify novel native genetic variants contributing to enhanced productivity, nutritional quality and resilience to abiotic and biotic stress in a diverse panel of landrace-derived germplasm. | Key Outputs in 2014: a) Four abiotic stress-focused genomic selection populations for sub-tropical and tropical adaptation advanced using non-marker and marker based selection, and b) Two abiotic stress-focused genomic selection populations for highland adaptation advanced using non-marker based selection. | |
| 2.1.3. Identify new donor landraces for drought stress. | | |
| 2.1.4. Continue the advancement of pre-breeding population and germplasm development from high value landrace materials deploying cutting edge breeding paradigms to accelerate the | | |
development of new breeding lines containing novel exotic alleles from accessions.

2.1.5 Develop integrated biometrics and genome-profiling support for the implementation of genomic selection (GS) in breeding programs, including proof-of-concept research.

Key Outputs in 2014: GS breeding projects supported for at least 6 breeding populations.

**2.2. Develop molecular phenotyping tools for maize breeding**

- **2.2.1. Improve the throughput and precision of phenotyping for abiotic stresses.**

- **2.2.2. Improve the throughput and precision of phenotyping for biotic stresses.**

- **2.2.3. Assess new phenotyping opportunities for core stress breeding within NARS and SMEs.**

Key Outputs in 2014 - **Validation and utilization of phenotyping tools for field variability visualization and management:** a) Improved precision phenotyping tools deployed in at least 5 phenotyping sites in collaboration with NARS partners; b) At least 15 technicians trained on high throughput precision phenotyping; c) Precision phenotyping manual developed, and d) Direct Percent Estimation method of disease phenotyping tested on a mapping population.

Key Outputs in 2014 - **Phenotyping sites/labs and tools for high throughput and reliable phenotyping of biotic stresses developed:** a) At least 15 NARES partners will be trained on novel phenotyping protocols for insect-pests, and; b) Stem borer mass rearing facility established in eastern and southern Africa to produce eggs/larvae to screen at least 1000 maize rows annually in each region.

Key Outputs in 2014: Direct Percent Estimation method of disease phenotyping tested on a mapping population (if DPE was found superior to 1-5 scale in 2013); b) At least 15 breeders, technicians, and partners trained on disease identification and direct severity estimation; c) Best practices for biotic and abiotic stress screening with cooperating NARS and SMEs documented and implemented; d) Technical backstopping of at least 5 NARS personnel regarding improved low N screening techniques provided; e) Biotic and abiotic stress BLUP values integrated into breeder decision tools, and; f) Second edition of stem borer and post harvest mass rearing and germplasm phenotyping manuals developed.

**2.3. Utilise Doubled Haploid technology to increase the accuracy, and reduce the time and cost, of breeding new maize**

- **2.3.1. Optimize the doubled haploid (DH) production pipeline**

- **2.3.2. Optimize the doubled haploid (DH) production pipeline**

- **2.3.3. Optimize the doubled haploid (DH) production pipeline**

- **2.3.4. Optimize the doubled haploid (DH) production pipeline**

Key Outputs in 2014 - **Doubled Haploid production pipeline optimized, and partners' capacity for DH-based breeding strengthened:** a) At least 10 tropically adapted inducer lines combining embryo and root color identified for deployment; b) At least 5 promising second generation tropically adapted inducer lines identified and advanced; c) Alternate chromosome doubling agents used in DH line development; d) At least 2 breeder-ready markers for high HI/R validated for...
<table>
<thead>
<tr>
<th>lines/varieties</th>
<th>deployment in haploid inducer development pipeline; e) inducer lines with high HIR and red root color marker evaluated under different locations in LA, Africa and Asia, and f) Segregating materials (second generation inducer lines) combining red root marker and R1-n marker advanced.</th>
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<tr>
<td><strong>2.3.2. Enhance breeding efficiency of MAIZE partner institutions through novel tools and strategies – Africa and Asia.</strong></td>
<td><strong>Key Outputs in 2014 - Development and dissemination of Doubled Haploid Products:</strong> a) At least 10 new Asian source populations subjected to haploid inductions, and; b) First set of DH lines developed from the Asia-adapted source populations.</td>
</tr>
<tr>
<td><strong>2.4. Develop better bio-informatic tools for breeders</strong></td>
<td><strong>Key Outputs in 2014 - Development of Doubled Haploid infrastructure:</strong> a) A functional, low-cost DH facility established and in operation in India, with necessary OHS procedures.</td>
</tr>
<tr>
<td><strong>3: Stress tolerant, nutritious and safe maize for resource-poor farmers</strong></td>
<td></td>
</tr>
</tbody>
</table>
- **3.1.2. Enhance stress resilience and yield potential of Subtropical Asian maize germplasm.**

Key Outputs in 2014 - *Molecular breeding for prioritized disease traits in Asia:* 

- a) Disease phenotyping at high precision carried out for IMIC-Asia prioritized traits; 
- b) Genetics of important diseases for Asia, like BLSB, PFSR, TLB and GLS, worked out with two seasons of high precision phenotypes, and; 
- c) Donors identified for the key traits and crosses initiated for development of improved germplasm, in collaboration with Asia based breeders.

- **3.1.3. Develop a new generation of heat tolerant lines.**

Key Outputs in 2014 - *Stress resilient subtropical Asian germplasm:* 

- a) Topcrosses of 200 segregating inbred lines derived from temperate x tropical crosses, and an additional 500 topcross for elite subtropical lines evaluated for per se performance at 4 locations and for key stresses; 
- b) Crosses between non-temperate stress tolerant/resistant donors and temperate elite chinese germplasm advanced through Doubled Haploid process; 
- c) Preliminary testing of at least 100 selected subtropical hybrids in MLTs across Asia; 
- d) Field demonstrations for China breeders organized for wider promotion of stress tolerant/resistant subtropical germplasm; 
- e) At least 30 inbred lines with resistance to multiple disease resistance traits (GLS, TLB, BLSB, polysora rust, Fv ear rot) developed; 
- f) At least 100 Test Crosses of early generation (S2/3) heat tolerant lines available for evaluation across heat stress-prone ecologies of South Asia; 
- g) At least 5 lines with improved heat tolerance and good combining ability for heat stress identified, for using as heat tolerant donor. Emphasis will be placed on traits favored by women and affecting the poorest such as heat and drought.

- **3.1.4. Develop drought tolerant maize inbred lines from CIMMYT, Syngenta and NARS sources – Asia.**

Key Outputs in 2014: 

- a) Four elite Asian adapted drought tolerant top cross or double cross hybrids developed. Emphasis will be placed on traits favored by women and affecting the poorest such as heat and drought.

- **3.1.5. Develop pre-release hybrids with combined heat and drought tolerance – Eastern and Southern Africa – in collaboration with CCAFS.**

Key Outputs in 2014: 

- a) Pre-release hybrids with combined heat and drought tolerance identified and submitted for multi-location national trials; 
- b) Selection of drought tolerant germplasm completed; 
- c) Pre-release hybrids with combined heat and drought tolerance submitted for DUS; 
- d) Seed production training conducted for emerging seed companies, CBOs and extension agencies. Emphasis will be placed on traits favored by women and affecting the poorest such as heat and drought.

- **3.1.6. Marker-assisted introgression of favorable genes/haplotypes between**

Key Outputs in 2014 - *Accelerated introgression of useful traits (emphasis of traits favoured by women) between temperate and tropical maize: a)*
**3.2. Develop and deploy nutrient efficient maize**

3.2.1. Improve efficiency of direct selection for yield in severely N-deficient soils – Eastern and Southern Africa.

**Key Outputs in 2014:** a) Soil Carbon and Nitrogen content in severely Nitrogen-depleted fields with high- and low-Nutrient Use Efficient varieties characterised.

Windows 1&2 = 88

Windows 3 & Bilateral = 2,128

**3.2.2. Manage N-efficient varieties for sustainability in African maize cropping systems – Eastern and Southern Africa.**

**Key Outputs in 2014:** a) Parental seed of Nutrient Use Efficient varieties available in sufficient quantity to support dissemination. Emphasis on traits favored by women and affecting the poorest such as nutrient use efficiency.

**3.3. Develop and deploy acid soil tolerant maize in Latin America and SE Asia**

3.3.1. Develop and deploy acid soil tolerant maize in Latin America and SE Asia.

**Key Outputs in 2014 - Phenotyping, product development and testing:** a) 100 selected inbreds phenotyped for acid soil tolerance, GLS, Tar Spot and ear rot response; b) 6 white and yellow acid soil tolerant hybrids tested in Asia and Latin America for potential release; c) 10 QPM hybrids tested in at least 10 locations in Asia and Latin America, and; d) Preliminary testing of 200 hybrids in 4 environments from Asia and Latin America.

**Key Outputs in 2014 - Marker validation and utilization:** a) GWAS-identified regions and candidate markers validated in at least 2 bi-parental/breeding populations, and their utility in improving acid soil tolerance ascertained; b) Key source breeding germplasm, including selected CMLs, characterized for the validated genomic regions, and; c) MAS in pedigree/BC generations initiated.

Windows 1&2 = 564

Windows 3 & Bilateral = 274

**3.4. Develop and deploy Striga resistant maize**

3.4.1. Evaluate effect of variety and management of maize-soybean rotations on Striga infestation and develop integrated approaches to Striga management - West and Central Africa.

**Key Outputs in 2014:** a) Mapping populations of maize phenotyped and genotyped for Striga resistance; b) Effects of maize variety and soybean maize rotation of Striga infestation on maize grain yield determined; c) New knowledge on the biology of Striga documented, and; d) Integrated management approaches to control Striga developed.

Windows 1&2 = 0

Windows 3 & Bilateral = 488
3.5. Develop and deploy Maize Lethal Necrosis Resistant maize

- 3.5.1. Develop, evaluate and promote improved maize lines and varieties with MLN resistance in SSA.

**Key Outputs in 2014 - Molecular breeding for MLN resistance:**

a) GWAS-identified regions validated in at least 2 bi-parental/breeding populations, and their utility in improving MLN resistance ascertained; b) Key source breeding germplasm, including selected CMLs, characterized for the validated genomic regions; c) MAS in pedigree/BC generations initiated; d) Fine-mapping of major QTL for MLN resistance (if any) initiated; e) Synthetics developed using MLN tolerant parents within A and B heterotic groups, and; f) Rapid-cycle genomic selection on synthetics initiated.

**Key Outputs in 2014 - Introgressing important disease resistance traits (resistance to MLN, MSV, GLS, TLB and mycotoxins) in African maize cultivars:**

a) DH lines possessing multiple disease resistance developed from at least 4 diverse populations and disseminated to African partners; b) At least 3 disease screening hubs in Africa fully equipped and used for reliable disease phenotyping, and quality disease phenotypic data generated by MAIZE partners in Africa for MSV, GLS, TLB, and mycotoxins; c) 300-400 new elite hybrids evaluated for MLN reaction under artificial inoculation in Kenya, and; d) 200-300 new elite CIMMYT, IITA and NARS inbred lines evaluated under artificial MLN pressure in Kenya.

**Key Outcomes in 2014 - MLN resistant product development:**

a) At least 2 hybrids with MLN tolerance identified and released by partners in eastern Africa.

3.6. Enhance traits that contribute to enhanced food, feed and industrial user quality

- 3.6.1. Increase yield potential and stress tolerance of QPM varieties for southern Africa, Asia and Latin America.

**Key Outputs in 2014 - Supplying the QPM pipeline:**

a) At least 1500 breeding families/segregating populations advanced; b) 800 advanced and promising lines and hybrids tested for QPM quality parameters; c) 10 QPM hybrids tested at least 10 locations in Asia and Latin America; d) Preliminary testing of 200 hybrids in 4 environments from Asia and Latin America.

**Key Outcomes in 2014 - Promoting existing QPM lines and varieties in Africa:**

a) Five QPM inbred lines with tolerance to drought and nitrogen stress available to partners; b) Two high yielding QPM hybrids resistant to major foliar diseases and tolerant to drought and nitrogen stress disseminated to seed companies, and; c) 50 tonnes of elite (multi-stress tolerant) QPM inbred lines and hybrids and disseminated to partners. Stacking of traits for combinations of traits that address needs and preferences of both men and women.

**Key Outcomes in 2014 - MLN resistant product development:**

a) At least 2 hybrids with MLN tolerance identified and released by partners in eastern Africa.

- 3.6.2. Advance gender sensitive deployment of high lysine maize in Ethiopia.

**Key Outcomes in 2014:** at least 5 high lysine maize varieties deployed in Ethiopia.
### 3.6.3. Meet the rapidly growing poultry sector requirements through value-added maize germplasm - Asia.

**Key Outputs in 2014 - Poultry feed development:**
- a) GWAS-identified regions for kernel methionine content validated in at least 2 bi-parental populations;
- b) Key source breeding germplasm, including selected CMLs, characterized for the GWAS-validated regions;
- c) MAS in pedigree/BC generations initiated in appropriate Asia-adapted elite maize germplasm, and
- d) Crosses made between elite lines (high carotenoids x high methionine; QPM x high methionine).

**Key Outputs in 2014 - Value-added maize germplasm for meeting poultry sector needs:**
- a) High methionine genomic regions validated.

**Key Outcomes in 2014:**
- a) Early generation high methionine elite lines in carotenoid-rich maize genetic backgrounds available for partners.

### 3.6.4. Evaluate maize varieties for grain and functional quality characteristics - SSA.

**Key Outputs in 2014:**
- a) More than 10 best varieties/hybrids evaluated for preference, grain and functional quality characteristics. Stacking of traits for combinations of traits that address needs and preferences of women.

### 4: Aligning with and strengthening local seed systems

#### 4.1. Adoption pathways & impacts related seed and grain innovations

<table>
<thead>
<tr>
<th>4.1.1. Review maize seed and grain regulatory systems – Global.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Outputs in 2014:</strong> a) Best practices for regulating maize seed and grain,</td>
</tr>
<tr>
<td>including GM and biofortified maize, and policies that enhance equitable and</td>
</tr>
<tr>
<td>accelerated access to seed and other inputs documented in peer-reviewed journal</td>
</tr>
<tr>
<td>article.</td>
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<tr>
<td><strong>Key Outputs in 2014:</strong> Policy options and institutional innovations that reduce</td>
</tr>
<tr>
<td>transaction costs, improve market access, and stabilize prices documented in</td>
</tr>
<tr>
<td>peer-reviewed journal article.</td>
</tr>
</tbody>
</table>

| 4.1.2. Review policy options and institutional innovations that provide an enabling environment for maize sub-sector development - Global. |

| **Key Outputs in 2014:** |
| Spatial and temporal diffusion of improved maize varieties and their gender differentiated impacts – sub-Saharan Africa, Latin America and Asia. |

| 4.1.3. Apply new tools and methods to assess the spatial and temporal diffusion of improved maize varieties and their gender differentiated impacts – sub-Saharan Africa, Latin America and Asia. |

| **Key Outputs in 2014:** |
| Adoption of Improved Maize Varieties in the Hills of Nepal and the impact of Community Based Seed Production documented (Data collection and analysis; Paper on “Determinants of maize variety adoption in the Hills of Nepal”; Paper on “Impact of Community Based Seed Production on maize farmers in the Hills of Nepal”); |
| Adoption of maize in Kenya, Malawi and Ethiopia documented in peer-reviewed journal article; |
| Risk, Crop choice and Maize Adoption in Africa documented in peer-reviewed journal article; |
| Maize Value Chain Analysis in Kenya conducted; |
| Maize Seed System in Eastern & Southern Africa |
| 4.1.4. Identify and overcome adoption constraints of new DT maize – SSA. | documented in peer-reviewed journal article, and; g) Maize Revolution in Sub-Saharan Africa documented in peer-reviewed journal article. |

**Key Outputs in 2014:**

a) DT maize adoption pathways and value chain interventions identified, including gender equitable innovations; b) Initial seed market analysis for new DT maize varieties completed and support provided for private companies to develop seed market strategies in 13 African countries; c) Options to enhance policy environment for DT maize delivery identified and advocated; d) Options for on-farm risk management and implications for investment in DT maize technology identified, discussed and communicated; e) Ex-ante impact assessment for DT maize updated and regional evidence on DT maize adoption documented in grey literature; f) Systematic collection and analysis of sex disaggregated data, and; g) Active recruitment of women enumerators and supervisors for adoption surveys.

| 4.2. Enhance improved maize seed delivery and adoption through improved public/private seed system partnerships in Africa, Asia and Latin America | 4.2.1. Double maize productivity in South Asia through public/private partnerships. |

**Key Outputs in 2014 - Seed production research:**

a) Detailed seed production data of new CIMMYT hybrids recorded, and; b) Information disseminated to seed companies, and feedback provided to breeders on hybrid seed production performance.

**Key Outcomes in 2014 - Targeted development and deployment of improved maize hybrids in Asia:**

a) DH development and dissemination of Asia-adapted elite genetic backgrounds scaled-up, and b) 10 Elite maize hybrids identified for deployment by 50 SME seed partners in Asia, including Nepal.

**Key Outcomes in 2014 - IMIC-Asia capacity building:**

a) At least all Gold Members provided with technical backstopping services; b) Strip trials conducted and field days displaying best-bet CIMMYT hybrids conducted, and; c) Seed production training for IMIC members.

**Key Outcomes in 2014 - High-yielding, stress tolerant maize germplasm for SE Asia:**

At least 5 best-bet hybrids identified based on MLTs in different SE Asian countries, and b) Nominations of promising hybrids by public/private partners for evaluation and commercial deployment.

**Key Outputs in 2014:**

a) Traits for improved performance under low N incorporated in breeding pipelines; b) Validation of the concept of increased planting density to increase GY in elite germplasm on a broader scale; c)
Manuscript drafted describing the effects of planting density on GY.8 hybrids tested in 16 environments from Ecuador, Bolivia, Colombia, Peru for potential release; d) Testing network maintained in tropical Latin America for white and yellow hybrids and OPVs with at least 20 sites in 10 countries (El Salvador, Nicaragua, Panama, Honduras, Guatemala, Colombia, Ecuador, Bolivia, Peru and Venezuela); e) At least two cultivars (hybrids/OPVs) identified for wide testing in each country; f) Three yellow QPM hybrids evaluated in 8 locations from Bolivia, Colombia, Ecuador and Peru; g) At least 30 tropical/sub-tropical hybrids tested in at least 8 environments in Latin America and Asia; h) DH lines generated from 5 selected source populations having ear rot and acid soil tolerance; i) 8 yellow/white selected hybrids tested in 16 environments in Latin America and Asia, and; j) Training of 2 Peruvian scientists on water use efficiency for maize breeding.

**Key Outcomes in 2014:**

a) At least five NARS/small seed companies backstopped in maize breeding and seed production; b) At least 3 cultivars released by NARS or national seed sector for commercial production in the region; c) At least two cultivars in commercial production by NARS and SMEs; d) One hybrid released in Colombia, Ecuador and Peru. High-yielding and stress resilient maize cultivars tested and deployed using a Latin American Regional Testing Network: 50 tonnes of Seed derived from selected materials increased and distributed for promotion and potential release by national partners and at least 15 hybrids with acid soil tolerance and Tar Spot resistance evaluated.

**Key Outputs in 2014:**

a) Marketing plans for products to overcome limitations of the main issues in adoption and commercialization of improved maize seed – Latin America.

b) 41,000 metric tonnes of drought tolerant maize varieties commercialized through SME seed companies through the DTMA Project; b) 15 basic seed units of male and female parents (each of 0.25 to 3 ha) of stress-tolerant hybrids produced, for emerging seed enterprises in ESA; c) Production of 50 tonnes of hybrid and OPV seed and
promotional materials for increased demonstration of improved varieties to farmers by seed sector; d) Breeder’s seed and basic seed of new CIMMYT hybrids/OPVs produced and provided to SME seed companies in ESA or start-up production; e) 18.6 tons of Basic Seeds for four hybrid varieties (three way hybrids) produced – Northern Tanzania; f) 12MT of parents of 1st hybrid bulked; g) 150MT of certified seed of 1st hybrid produced; h) 1.2MT of parents of 2nd hybrid bulked - Zimbabwe, Malawi, Zambia, Tanzania and Kenya; i) 3 varieties released—Uganda, and; j) 2 DTMA-derived drought tolerant maize varieties released in Somalia.

Key Outputs in 2014 - Training of emerging seed enterprises in seed production and business management: a) One training course in which 25 personnel from emerging seed companies from Africa and Asia are trained in seed production and management; b) 130 staff of NARES, Seed Companies and CBOs/NGOs trained on seed production technology & management; c) Technical consultancy provided to SME seed companies in ESA; d) At least 200 germplasm collections made to be evaluated over 2 seasons; e) 10-20 pre-selections evaluated over 3 seasons in multi-locations; f) Seed production cost models developed, and; g) Seed Road Maps in Eastern and Southern Africa developed.

Key Outcomes in 2014 - Support for seed storage: a) Medium-term seed storage facilities upgraded at key national patner locations, and; b) NARES in the DTMA target countries equipped with priority infrastructure.

### Key Outputs in 2014: a) Hermetic grain storage technologies demonstrated, and training imparted to relevant stakeholders for effective scale-out; b) At least 500 on-farm validations undertaken in Eastern and Southern Africa; c) Links established with manufacturers of storage structures for effective scale-out; d) Training workshop organized for 50 relevant stakeholders on effective post-harvest management; e) At least 50% of beneficiaries are to be women, 10% socially vulnerable groups (HIV affect, orphanage schools); f) Research to better understand what constitute barriers for people’s (female, male) ability to take up and benefit from improved technologies conducted, and; g) Gender aware approaches promoted amongst local teams and partners.

### Key Outputs in 2014: a) Relative importance of losses due to insect pests in field

**Key Outputs in 2014:** a) One superior insect resistant maize variety released in target countries in Eastern and Southern Africa.

<table>
<thead>
<tr>
<th>3.2. Reduce losses and improve safety through bio-control of aflatoxins</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.2.1. Improve mycotoxin detection</strong> – global.</td>
</tr>
<tr>
<td><strong>Key Outputs in 2014:</strong> a) Three disease screening hubs in Africa fully equipped and used for reliable disease phenotyping; b) Support provided to several Latin American partners (outside of Mexico) to determine prevalence and levels of mycotoxin in maize in their countries, and c) Aptamers for the rapid detection of aflatoxins developed.</td>
</tr>
<tr>
<td><strong>Windows 1&amp;2 = 537</strong></td>
</tr>
<tr>
<td><strong>Windows 3 &amp; Bilateral = 717</strong></td>
</tr>
<tr>
<td><strong>3.2.2. Improve mycotoxin resistance of maize germplasm</strong> – global.</td>
</tr>
<tr>
<td><strong>Key Outputs in 2014:</strong> a) At least 20 ear rot resistant and mycotoxin tolerant maize lines for Africa and Latin America identified; b) Doubled Haploid lines possessing multiple disease resistance developed from at least 4 diverse populations and disseminated to Africa, and; c) Stacking of traits for combinations of traits that address needs and preferences of both men and women (safe food).</td>
</tr>
<tr>
<td><strong>3.2.3. Develop aflatoxin biocontrol products</strong> - SSA.</td>
</tr>
<tr>
<td><strong>Key Outputs in 2014:</strong> a) Atoxigenic strains for aflatoxin biocontrol identified, tested and promoted in Senegal, Zambia, Mozambique, Ghana and Tanzania, and; b) At least one regional strain with wide distribution for Aflasafe product identified.</td>
</tr>
<tr>
<td><strong>3.2.4. Build capacity for aflatoxin mitigation</strong> - SSA.</td>
</tr>
<tr>
<td><strong>Key Outputs in 2014:</strong> a) One mycotoxin laboratory established/equipped in Mozambique and Senegal.</td>
</tr>
</tbody>
</table>

**CRP Management**

<table>
<thead>
<tr>
<th>(Global)</th>
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<tbody>
<tr>
<td>Windows 1&amp;2 = 2,159</td>
</tr>
<tr>
<td>Windows 3 &amp; Bilateral = 0</td>
</tr>
</tbody>
</table>

**All other levels in OCS**
Table 2 – Planned CRP gender research budget: expected gender research results and associated budget

<table>
<thead>
<tr>
<th>Level of organisation within the CRP</th>
<th>Expected Gender research results as described in Table 1</th>
<th>Planned gender research budget (€ 000s)</th>
</tr>
</thead>
</table>
| **Level n-1: Flagship Projects that contribute to the CRP gender IDO and if relevant other IDOs that have a gender dimension**  
Use one row per Flagship (same numbering system as in Table 1) and indicate for each Flagship the type of expenses concerned (e.g., capacity strengthening in gender research, collaboration with other CRPs,...) so it is clear there is no double counting with funds in the Clusters of activities below  
Flagship Project 1: Sustainable intensification and income opportunities for the poor. (Regional and national). | Expected progress toward the CRP’s gender IDO and if relevant other IDOs that have gender equity dimension. Indicate, where relevant, the geographical areas of focus | |

- Analyse gender differentiated impacts associated with the adoption of maize-technologies & revise gender strategy. Target area – global.
- Consolidated knowledge on adoption and gender differentiated impacts of maize technologies in maize-based farming systems in Africa, Asia and Latin America documented.
- Mainstream gender during ‘product’ discovery, validation and scale-out. Identify technologies/innovations with potential to positively influence women’s workload, health, access to resources and know-how. Proactively stimulate women farmers’ participation in field days and feed back to researchers. Collecte and analyse gender disaggregated data.
- Undertake gender analysis of nutrient management in smallholder maize-based systems. Identify interventions that positively influence women’s workload, health, access to resources and know-how.
- Gender Strategy revised by May 1, 2014. MAIZE projects systematically assess and address gender and social differentiation, which is articulated in gender commitments and budgeting throughout the project cycle.
- Strategic gender research and experiences from integrating gender in specific projects strengthen the gender-and-MAIZE evidence base, as well as priority-setting and targeting of MAIZE R4D.
- Encourage/implement collection of gender disaggregated data in ongoing and new projects.
- Incentivise researchers to produce gender related/sensitive outputs.

Flagship Project 2: Novel tools and traits to increase genetic gains in maize.

- Geno- & phenotyping of genetic resources for identification of materials with traits of specific interest to particular groups (e.g. specific quality traits).

Flagship Project 3: Stress tolerant, nutritious and safe maize for resource-poor farmers.

- Proactive inclusion of female farmers and disadvantaged groups in trait prioritization, variety feedback (e.g. MBTs, NMVTs, and field days), awareness campaigns (field days, sample packs). Initiate integrative research on gender as a customer attribute. Actively recruit women field staff, enumerators and supervisors for 'farmer-level' activities, wherever possible, taking into account their special needs. Promote gender aware approaches among local teams and partners.

- Include women in all research stages: discovery (trait prioritization), validation (NVMT, MBTs), and scale up (field days, seed packs). Sensitize seed companies and NARES in gender-appropriate demonstrations and field days. Collect gender disaggregated adoption data in areas where improved maize seed has been promoted. Conduct research to better understand what constitute barriers for people's (female, male) ability to take up and benefit from improved technologies. Inclusion of female farmers and disadvantaged groups in trait prioritization, validation and seed production (Nepal). Document level and type of outcomes, and impact and draw lessons for feeding back into the R4D process (Nepal). Include diverse germplasm, OPVs, improved landraces, local materials improved for important local regional stresses. Involvement of farm families in field days for preferences, uses and marketability.

- Enhance maize traits that contribute to enhanced nutrition among women and children, in particular high lysine maize and high Vitamin A maize, in collaboration with CRP Agriculture Nutrition & Health. Based on user demand, enhance traits that contribute to enhanced feed and industrial user quality. Develop participatory variety selection strategies which target specifically women and young adults. Dissemination information targeting individuals (both women and men) rather than households. Create awareness throughout product development and delivery, with the support of health extensionists.

Flagship Project 4: Aligning with and strengthening local seed

- Discuss gender-aware data dissemination strategies and gender-based
systems. Impact assessment methods with gender specialists. Emphasis is on traits favored by women and affecting the poorest: DT, herbicide resistance, NUE.

Flagship Project 5, Integrated postharvest management.

- Proactively engage women in the awareness of post-harvest solutions that improve household food security and incomes. Conduct research to better understand what constitute barriers for people's (female, male) ability to take up and benefit from improved technologies. Promote gender aware approaches among local teams and partners.

CRP Management

Level n-2: Cluster of activities
Use one row per relevant Cluster of activities
For instance:
Cluster of activities 1.3 (title)

| Expected research outcomes and outputs that have a gender/equity dimension (from Table 1). |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| - Gender research outcome 1.3.a: (title)        | - Gender output 1.3.b: (title)                   |

Indicate the funds planned for gender research in Cluster 1.3, to produce all the research outcomes and outputs listed for this Cluster

1.1. Adoption pathways & impacts - sustainable intensification:

Key Outputs in 2014: a) Adoption Pathways Project conducted. Windows 1&2 = 0
Windows 3 & Bilateral = 665

1.2. Promote sustainable intensification in Africa:

Key Outputs in 2014: a) Gender specialist support for sustainable intensification in Eastern and Southern Africa (SIMLESA II Project); b) Gender analysis of small-scale farm power mechanization in maize-based systems in Africa to inform research for development implementation and strengthen the promotion of gender equality and women’s empowerment, and; c) Integration of gender perspective in introduction, testing and adaptation of two-wheel tractors in selected African countries.

Windows 1&2 = 47
Windows 3 & Bilateral = 3,289

1.3. Promote sustainable intensification in Asia:

Key Outputs in 2014: a) Integration of gender in maize-based system interventions in South Asia strengthened—recruitment of mid-senior level gender expert in process.

Windows 1&2 = 16
Windows 3 & Bilateral = 1,535

1.4. Promote sustainable intensification in Latin America:

Key Outputs in 2014: a) Study on gender and social inclusion in relation to technological change conducted.

Windows 1&2 = 13
Windows 3 & Bilateral = 33

1.5. Strengthen the use of precision agriculture for small-holder farmers in Latin America:

Key Outputs in 2014: a) Gender sensitive study on smallholder nutrient management in maize-based systems (IPNI/Africa – 2013 CGI) conducted.

Windows 1&2 = 0
Windows 3 & Bilateral = 0

1.6. Coordinate gender targeting and mainstreaming

Key Outputs in 2014 - Follow-up to gender audit: a) Gender capacity building framework developed; b) Gender policy formulated; c) Gender-in-Project-Design-tool rolled out; d) Procedure for Gender Screening of research proposals.

Windows 1&2 = 516
Windows 3 & Bilateral = 0
developed; e) Cross-CRP global, comparative study on gender norms and agency in agriculture: Minimum 10 case studies initiated; f) RMS-based gender progress monitoring tool developed and piloted; g) Integrative gender research in relation to following topics - Seed systems, Climate change, Crop improvement, Innovation systems, Post-harvest management, Technology diffusion, Mechanization, and Nutrition coordinated; h) Elaborate Gender Strategy by May 1, 2014 with research plan, research objectives, related research questions, methods and budgets (as per the Consortium Guidelines); i) Tools, policies and capacity for gender integration in MAIZE developed; j) Awareness created and gender integrated into project design, implementation, and analysis and reporting.

<table>
<thead>
<tr>
<th>2.2. Develop molecular and phenotyping tools for maize breeding:</th>
<th><strong>Key Outputs in 2014:</strong> a) Special study on gender equality in professional capacity enhancement with a view to identify concrete avenues for empowering women professionals through modified approaches to capacity strengthening (approved KIT proposal under MAIZE 2013 CGI).</th>
<th>Windows 1&amp;2 = 107</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1. Develop and deploy climate resilient maize:</td>
<td><strong>Key Outputs in 2014:</strong> a) Proactive inclusion of female farmers and disadvantaged groups in trait prioritization, variety feedback (eg MBTs, NMVTs and field days), awareness campaigns (field days, sample packs); and; b) Gender disaggregated adoption data available in areas where seed has been promoted.</td>
<td>Windows 1&amp;2 = 81</td>
</tr>
<tr>
<td>3.2. Develop and deploy nutrient efficient maize:</td>
<td><strong>Key Outputs in 2014:</strong> a) Women farmers will constitute at least 30% of participants in PVS and sex-disaggregated data on farmer preference information used to predict adoption and inform release and seed production decisions, and; b) Practical guidelines for integrating gender in PVS, aimed at scientists and research teams developed.</td>
<td>Windows 1&amp;2 = 18</td>
</tr>
<tr>
<td>3.6. Enhance traits that contribute to enhanced food, feed and industrial user quality:</td>
<td><strong>Key Outputs in 2014:</strong> a) Gender in validation and dissemination of quality protein maize for improved food and nutrition security implemented, and; b) Addition of local Ethiopian gender specialist to the MAIZE team in Ethiopia.</td>
<td>Windows 1&amp;2 = 82</td>
</tr>
<tr>
<td>4.1. Adoption pathways &amp; impacts related seed and grain innovations</td>
<td><strong>Key Outputs in 2014:</strong> a) Roll-out of guidelines for sex-disaggregation in survey data collection and analysis finalized, and; b) Impact assessment on community-based seed production in Nepal focusing on gender and marginal groups conducted.</td>
<td>Windows 1&amp;2 = 415</td>
</tr>
</tbody>
</table>
### 4.2. Enhance improved maize seed delivery and adoption through improved public/private seed system partnerships in Africa, Asia and Latin America:

<table>
<thead>
<tr>
<th>Key Outputs in 2014:</th>
<th></th>
</tr>
</thead>
</table>
| a) Understanding gender as a customer attribute for improved adoption and strengthening of seed sector development in Eastern and Southern Africa (Study by Vongai in DTMA); b) Targeted interventions for increased adoption of new and profitable maize varieties and improved technologies to enhance productivity and marketing opportunities of poor farmers, especially women and socially disadvantaged groups implemented; c) Inclusion of female farmers and disadvantaged groups in trait prioritization, validation and seed production (Nepal), and; d) Gender disaggregated adoption data in areas where seed has been promoted. | Windows 1&2 = 491  
Windows 3 & Bilateral = 1,483 |

### 5.1. Reduce losses and improve safety through improved maize storage:

<table>
<thead>
<tr>
<th>Key Outputs in 2014:</th>
<th></th>
</tr>
</thead>
</table>
| a) Gender analysis of improved smallholder grain storage technologies in selected African countries: Lessons and implications for agricultural research conducted. | Windows 1&2 = 112  
Windows 3 & Bilateral = 614 |

### CRP Management

|  |
| Windows 1&2 = 240  
Windows 3 & Bilateral = 0 |

**TOTAL GENDER BUDGET FOR THE CRP (SUM OF ALL CELLS ABOVE)**

14,678
Annex 1 – Introducing DAC Gender Markers into MAIZE Budgeting

<table>
<thead>
<tr>
<th>Levels</th>
<th>Criteria/Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - Projects with gender equality as the SOLE objective</td>
<td>100% Sole use for (strategic) gender research. Budgets of gender specialists.</td>
</tr>
<tr>
<td>3 - ... a PRINCIPAL objective</td>
<td>75% Majority are women beneficiaries and they are selected and will be likely the main partners/beneficiaries/users of the project results.</td>
</tr>
<tr>
<td>2 - ... a SIGNIFICANT objective</td>
<td>25% Gender is mainstreamed in these projects and significant/substantive benefit by women is will be achieved and documented.</td>
</tr>
<tr>
<td>1 - ... with SOME CONTRIBUTION to gender equality</td>
<td>10% Projects with evidence that they work on women prioritized constraints (eg processing, quality, HH food security) or generate products/outcomes that are particularly relevant for women (eg lower wheat prices). Effort to reach women needs to be made.</td>
</tr>
<tr>
<td>0 - Projects that do not expect to contribute significantly to gender equality</td>
<td>0% Gender neutral research; Examples: Genebank, molecular breeding, bioinformatics.</td>
</tr>
</tbody>
</table>

Adapted from UNDP approach:

Annex 2 - Different phases in Flagship Projects

**Discovery phase**
- New concept of product, service, or process
- (n=1000s)

**Proof of concept phase**
- Testing of proof of concept in real world / controlled conditions
- (n=100,000s)

**Pilot phase**
- Multi-location release/trials for smallholder benefit
- (n=1,000,000s)

**Scaling up phase**
- Release for scaling up & adoption in different locations
- (n=1,000,000s)
Conclusions & Decisions:
1. The FC approved the 6-month contract extension proposals for the 3 CRPs (FTA, AAS and Maize).
2. The FC approved the increase in budgets for the 3 CRPs (FTA, AAS and Maize) detailed in Table A below as follows:
   - a total increase in budget from all sources (W1, W2, W3 and bilateral) of $65.3 million
   - a total increase in budget from W1 and W2 of $20.8 million

Table A (Figures in 000 USD):

<table>
<thead>
<tr>
<th></th>
<th>Windows 1&amp;2</th>
<th></th>
<th>Windows 3 &amp; Bilateral</th>
<th>Total</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Projected</td>
<td>Approved</td>
<td>Increase</td>
<td>Projected</td>
<td>Approved</td>
</tr>
<tr>
<td>AAS</td>
<td>37,822</td>
<td>32,273</td>
<td>5,549</td>
<td>47,202</td>
<td>27,147</td>
</tr>
<tr>
<td>Maize</td>
<td>51,055</td>
<td>44,700</td>
<td>6,355</td>
<td>174,791</td>
<td>193,100</td>
</tr>
<tr>
<td>FTA</td>
<td>99,200</td>
<td>90,300</td>
<td>8,900</td>
<td>167,070</td>
<td>142,600</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>20,804</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>