

CRP on Water, Land, and Ecosystems (WLE) for Phase 2 (2017-2022): Addendum to the Full Proposal Responding to ISPC Commentary dated 15 June 2016

1. Introduction

WLE appreciates the ISPC's thoughtful commentary on our full proposal for Phase 2, and is pleased to have an opportunity to respond. We are delighted that the ISPC has confirmed the critical importance of WLE to achieving the ambitious goals and grand challenges of the CGIAR Strategic Results Framework (SRF), especially for achieving SLO 3, *Improve natural resources and ecosystem services*. The commentary observes that "[t]he ambition of WLE is central to the SRF and IDOs. It addresses a grand challenge that underpins the entire CGIAR – it covers areas that have been under-invested by the CGIAR in the past". The ISPC recognizes the excellent progress WLE has made since its initial pre-proposal in developing its research agenda, highlighting among others "its potential role in providing a pathway to enhance delivery of the System as a whole", its alignment of research with global policy objectives, its selection of appropriate partners, and its Capacity Development strategy.

The commentary requests that WLE prepare an addendum to the proposal that responds to five key issues summarized on page 2 of the ISPC Commentary. For all five issues, ISPC is seeking clarification and further details to enable a full understanding of WLE's proposal. That is the subject of this document. ISPC has not asked for revisions; therefore, we have not made substantive changes to the text of the proposal, its budget or PIM information, except for editing for clarity and in a few cases, updating of information. We have also updated Annex 3.6 on linkages to other CRPs and have made minor revisions in the proposal text to improve its clarity. These are listed in the annex to this Addendum. In Section 2 below, we respond to each of the five key issues identified. For each key issue, we briefly explain our understanding of the concern raised, and then offer further clarification and information as well as specific actions we will take, as appropriate.

Incorporated within the five key issues, the ISPC's commentary offers a number of very useful observations and suggestions pertaining to the overall proposal and individual FPs. We have considered these carefully and our responses below address the major concerns raised. WLE will of course seriously consider all of the ISPC's suggestions during the detailed research planning process. While we have not been requested to respond to all detailed comments, in Section 3 we provide brief responses to three ISPC observations and one Consortium Office comment where we feel clarification is required. Section 4 offers a few concluding observations.

As observed in the ISPC's 16 June 2016 commentary on the overall portfolio (pages 9-10), the allocation of W1&W2 funding to individual CRP programs was "based on history rather than strategic on prioritization"; i.e. it was based on the most recent allocations of W2 funding and an equal allocation of present W1 funds across each proposed CRP, and not based on strategic priorities of the portfolio. The result for WLE is a relatively low level of W1/W2 funding for the size of the program. Recognizing this anomaly within the portfolio budget assumptions, in developing the WLE Phase 2 program we designed it based on the guidance provided by the CO and others on the overall size of the program. In addition to the ISPC comment, we note that across the portfolio, SLOs 1&2 account for 77% of the total estimated 6-

year budget, while SLO3 (NRM) accounts for just 23%¹. We believe this is too low from a broader portfolio perspective and does pose serious challenges for WLE, as highlighted by the ISPC's comments on specific flagships. This could be addressed by adjusting the overall allocation of W1 funds across the portfolio, but we recognize this is a matter for the System Council.

2. Responses to Key Highlighted Points

In the ISPC's commentary, two of the five main points are combined into one, with multiple supporting observations. In this response, we have followed the same approach and similarly combined our clarifications for these two highlighted points (the third and fourth in the ISPC commentary). In each case, we offer a brief statement of our interpretation and understanding of the issue followed by our response.

a) Further elucidation of the process of prioritization at the basis of the research agenda for the CRP, and how this affects the functional integration amongst FPs, and with the other AFS and GIP CRPs.

Interpretation:

This request constitutes the concluding statement in the ISPC's discussion of WLE's Theory of Change and Impact Pathway. Many of the observations are very positive, but the commentary also states: "Although the justification for the proposed activities has been bolstered in this final proposal relative to the pre-proposal, the means and justification for prioritizing activities in the FPs and CoAs is not sufficiently clear." Elsewhere, the commentary suggests that "there is no evidence that WLE will follow a phased process in improving cross-CRP collaboration and integration as recommended by the ISPC". Our understanding of this request is that the ISPC would like more clarity on how WLE sets its research priorities within and among its Flagship Programs (FPs) and with regard to its joint work with other AFS and GIP CRPs.

Response:

Process of prioritization. In developing the Phase 2 proposal, WLE undertook a multi-pronged process that informed the selection of research priorities and helped us to triangulate on issues that we believe are critical, including those highlighted in the IEA evaluation of Phase 1. We did not consider it feasible or cost-effective to set criteria *a priori* and then follow a scoring and screening process. The Results Based Management (RBM) system being introduced for Phase 2 (described in detail in Annex 3.5) will help us distinguish among the best investments across the program as we move through implementation. The process we have followed included:

- Assessment of the updated SRF (2016-2030) document and identification of WLE's comparative advantage to contribute to the SLOs, IDOs, indicators and grand challenges.
- Explicit assessment of potential contributions to the SDGs and to Paris Climate Agreement goals.
- Building on the lessons learned and progress of Phase 1, and particularly the feedback from the recent year-long IEA evaluation of WLE as well as feedback from the ISPC, the Consortium Office, and others.
- Holding extensive consultations, mainly in the four regions where WLE will focus its efforts (Ganges, Greater Mekong, Volta-Niger and Nile/East Africa). We held regional consultations and have regular discussions with internal and external partners in target countries. These include research

¹ From "Contribution estimates from 1st submission of full proposals 22 April 2016" (Consortium Office). The data is drawn directly from Table A of the proposals.

organizations, international finance institutions (IFIs), river basin and other regional organizations, governments, and the private sector. Along with participating in high-profile events such as the Global Landscapes Forum, these consultations helped shape the program. In the regions and in cooperation with AFS CRPs, WLE has played a leading role in site integration meetings, particularly in Ghana, Bangladesh and Nepal, and contributed to meetings in Vietnam, Ethiopia, Nigeria and India, as well as Laos. WLE's Enhancing Sustainability across Agricultural Systems (ESA) Flagship has built on these discussions along with AFS CRPs. For instance, work in the Mekong will focus on better understanding the impacts of upstream development on delta agro-ecosystems. In Ghana, the focus will be on improving dry season agriculture to adapt to climate change in a context of increasing variability in rainfall and streamflow.

- Consultations by each flagship, comprised discussions with both CGIAR and external partners on who would be involved in Phase 2, what research questions should be asked, and what outcomes and impacts we should try to achieve. This included intensive in-depth discussions with the leaders of other CRPs, as reflected in Annex 3.6 on linkages and site integration.

In essence, the WLE program for Phase 2 is demand-driven and based on strong partnerships (Annex 3.1 describes WLE's effective partnership network at local, national, regional and global levels). WLE has held intensive consultations with multiple partners; its scientists engage in policy discussions at the national level and participate in many international forums and consultations, especially around the SDGs and climate change, in order to be aligned with international priorities. WLE also has built on its scientists' knowledge of the cutting edge academic literature and gaps that WLE can productively fill. We focus on areas where we believe WLE has a strong comparative advantage— and where we do not have this but understand it is a critical domain, we have identified partners who do have the needed capacity.

At the program level, we prioritized issues critical to achieving the SDGs and CGIAR targets and “Grand Challenges”, identifying areas where WLE can add value to the CGIAR portfolio as a whole and has a distinct comparative advantage. Our comparative advantage is based on our strong set of complementary research and development partners, our extensive network of country-based offices and relationships spanning farm to landscape and river basin scales, and our active participation in important global initiatives. We have built on previous accomplishments, and selected areas where WLE has significant potential to contribute to achieving social and economic equality, and to solving emerging natural resources management (NRM) challenges critical to sustainable intensification of agriculture that are not being addressed adequately by others. Examples of emerging priorities included in Phase 2 are an increased emphasis on soils and further development of research on the sustainability and dynamics of peri-urban agriculture and its value chain linkages. No others are working effectively at the landscape scale on these issues. WLE often acts as a catalyst to bring others together to solve complex problems; our work on resource recovery and reuse (RRR) business models is an example of this catalytic role.

Similarly, the program has increased its focus on sustainability at scale and reduced its previous prioritization of research on individual ecosystems and their services, following IEA and ISPC feedback. This will manifest itself through developing and applying indicators, including engaging with partners to further refine and apply SDG indicators and the linkages between them. At a breakout session of the CGIAR science leaders meeting on 16th June 2016, co-development, testing and application of a portfolio-wide sustainability framework and indicators by WLE with and by the AFS-CRPs was highlighted as being a very important planned activity.

Geographically, as shown in Annex 3.6, WLE prioritizes CGIAR integration countries in four regions (Greater Mekong Region, the Ganges, and East and West Africa) to capitalize on its well-established partner networks and convening power. These countries include Burkina Faso, Ghana and Nigeria; Ethiopia, Uganda and Tanzania; Bangladesh, India and Nepal; and Vietnam. While maintaining the linkages to our key partners in these regions, WLE has re-framed its research and impact pathways to emphasize joint activities with the AFS CRPs, especially in integration sites, and has sharpened its focus on the agricultural dimensions of cross-sector dialogues.

Functional integration of WLE FPs. WLE believes that its four thematic FPs (RDL, LWS, RUL, VCR²), taken together and combined with the integrative work through the ESA FP, offer a comprehensive integrated program able to achieve significant outcomes and impacts and thus contribute substantially to the ambitious goals of the CGIAR portfolio as a whole. Each of the four thematic FPs addresses a critically important issue; and together they form a coherent integrated body of work. Addressing only one or two issues would compromise the Program's ability to deliver its overarching goals and hence would undermine its ability to contribute meaningfully to the SRF.

In Phase 2, WLE FPs will concentrate their work in integration sites where AFS and GIP CRPs also work, frequently through the same local and national partners. Depending on the project, in many cases this will involve direct collaboration among CRPs. In addition, although much of the work is organized and presented as projects or activities within specific FPs, there are multiple synergies among them. Some examples include:

- In the Greater Mekong and the Ganges regions, collaborative research involving the ESA, LWS, and VCR FPs, with the FISH, RICE and CCAFS CRPs, will address water-food-energy nexus issues that could not be done by one flagship or CRP alone. This involves integration of analysis of impacts of interventions upstream with field and community-level research on rice and fish production in the deltas (Vietnam and Bangladesh).
- In the Volta-Niger region, ESA activities are aligned with LWS and RUL projects around improving agricultural water management (especially in the dry season) and nutrient recycling to address climate variability and food security. This work is linked to Livestock and CCAFS activities.
- In East Africa (Uganda and Ethiopia) and India, ESA projects work with the RDL and LWS FPs on landscape restoration, soil carbon and decision-analysis, and introducing more effective water management practices.

WLE uses several mechanisms to ensure greater integration. WLE's management team, which includes the FP leaders, will prioritize identifying and implementing opportunities for integrated FP research where this will add significant value. In addition, WLE is proposing to use [a write-shop process](#) developed and successfully applied in the WLE Focal Regions in Phase 1 to better align flagship activities internally and across the WLE portfolio. The advantage of this process is that integration occurs at many levels – partnerships/outcomes, research questions, methodologies and site locations. Other mechanisms include on-line webinars to share lessons and experiences, and cross-cutting communities of practice.

² Respectively, FP1 Regenerating Degraded Landscapes, FP2 Land and Water Solutions for Sustainable Intensification, FP3 Sustaining Rural-Urban Linkages, and FP4 Managing Resource Variability, Risks and Competing Uses for Increased Resilience.

Prioritization and integration with other CRPs. Annex 3.6 provides specific details regarding the phasing-in of planned collaborative research with both other GIP CRPs and AFS CRPs. They are also included in the proposals of those CRPs. WLE's main collaboration mode with other CRPs is to develop joint activities in key thematic areas and geographies, mainly the CGIAR target countries, to undertake scoping studies, and where there is real potential for progress, to develop joint proposals to implement the research as pilots and proof of concept, and scale up the results. This is a phasing process, and at the outset will primarily involve four AFS CRPs (RICE, FTA, Livestock and DCL³) with which WLE has developed specific integrated research plans. The ESA FP has been developed in consultation with AFS partners to work at larger scales, complementing and facilitating our initial partnerships.

In Phase 2, three WLE FPs will collaborate with CCAFS. RDL and LWS plan to collaborate with CCAFS on NRM practices, particularly soil organic carbon building practices, that enhance adaptation and reduce greenhouse gases (GHGs) for testing in CCAFS climate-smart villages; and to link with regional and national partners for climate change policy impact and scaling up climate smart agriculture interventions (largely in Africa). WLE's VCR Flagship will continue its strong links with CCAFS, rooted in years of productive collaboration in Phase 1. VCR will co-invest with CCAFS in developing and field testing landscape-based solutions for adapting to and mitigating water resources variability in agriculture, and co-developing scalable interventions (e.g. drought monitoring and pro-poor flood insurance) that use climate- and water-related information to manage climate-related risks (largely in South and Southeast Asia).

WLE will collaborate closely with PIM and CCAFS, particularly on landscapes, value chains and climate change. PIM's gender research is done at multiple levels, with a strong emphasis on issues such as equitable access to markets, information and NRM governance, and land tenure systems within shared landscapes. WLE's comparative advantage lies in integrating work at landscape and national levels with multi-disciplinary research on water, land, soils and biodiversity. Through LWS and WLE's Gender and Inclusive Development (GID) theme, we will work closely with PIM on irrigation, land tenure and water rights. A discussion was recently initiated on collaboration between PIM's CoA 2.1 (Agricultural Transformation and Rural Incomes) and WLE RUL's CoA 3.1 (City-Region Food Systems); this has been added to Annex 3.6 on inter-CRP linkages.

WLE's VCR Flagship is the primary vehicle for collaboration with the FISH CRP. The benefits of flooding (associated primarily with fisheries and agriculture) in large inland floodplains and deltaic systems, such as the Mekong Delta, may be an order of magnitude higher than annual costs of flood damage. Thus, management of variability needs to consider both the spatial distribution of costs and benefits as well as the need to avoid/ minimize damage and optimize the benefits. VCR will collaborate with the FISH CRP to examine the trade-offs of sustaining fisheries in different development options.

WLE and RICE's joint research activities are focused on the optimization of land and water resources at the field to landscape and polder levels in rice-based farming and aquaculture systems. Collaboration will be through site integration at common geographies in Asia's mega-deltas and coastal zones (in

³ We acknowledge that DCL, or L&DC as it is now called, is still under development and review. In developing this Addendum, we have continued to engage with the DCL team, as well as with other CRPs (e.g. FISH). If necessary, we will re-prioritize once the portfolio is finalized. For the purpose of the re-submission we have maintained the acronym DCL to refer to this CRP.

Bangladesh, Myanmar, and Vietnam). This builds on on-going collaboration between WLE and RICE, formerly the Global Rice Science Partnership, and national partners in these areas. It will particularly focus on:

- Supporting the delineation and mapping of domains for RICE technologies, particularly to incorporate drought, salt, or submergence-tolerant rice varieties, and improving water and rice management practices.
- Jointly analyzing and quantifying the impacts of agricultural water management solutions at larger spatial scales, such as irrigation systems or river deltas, and providing feedback for further improvement of such solutions by RICE.
- Strengthening the biophysical and socioeconomic sustainability of rice-based cropping systems, including provision of multiple ecosystem services, further developing WLE's sustainability framework for scaling up of RICE technologies, and expanding the ecosystem services of rice farms as measured using landscape-level indicators.

At the operational level, WLE, PIM, A4NH, and possibly MAIZE and WHEAT, led by CCAFS, are developing an online planning and reporting system called "Managing Agricultural Research for Learning and Outcomes" (MARLO). It will be operational at the end of 2016, ready for a 2017 start. It will be one system, reducing transactions costs for those that work on more than one CRP through standardization of nomenclature and concepts. Over time, this will allow for results and information to be aggregated at the SRF level. We have also proposed two joint reviews in several countries to look at the progress/constraints of common integrative approaches work.

To conclude, it is important to understand that WLE's planned activities with other CRPs could not be done nearly as well by any single CRP by itself. Collaboration among CRPs brings together strong teams with complementary expertise and partners that together create a strong comparative advantage in solving critically important NRM problems affecting agricultural productivity.

b) Clarification of the focus of the CRP on facilitation versus science, accompanied by a description and clarification of the science, technology, and innovation agenda (particularly for FP1, FP2 and FP4).

Interpretation:

This request is elaborated in the section of the ISPC commentary providing an overall analysis of the full proposal's contribution to the overall CGIAR portfolio. We understand from this comment that the ISPC has the impression that WLE is reducing its science role in favor of emphasizing its facilitation role. The ISPC commentary questions whether WLE will provide "core science support" to the AFS CRPs in soil and water management and ecosystem impacts. Finally, the commentary also wonders whether "WLE aims to take the CGIAR far beyond the limited technical fields addressed by IWMI in the past". WLE is requested to provide some specific clarifications related to FPs 1 (RDL), 2 (LWS) and 4 (VCR).

Response:

Facilitation and science. ISPC has raised a concern about the program overly focusing on facilitation at the expense of science; however, we feel the proposal does demonstrate an appropriate and needed balance.

We believe that our unique comparative advantage lies in the integration of *both* science and facilitation, with research applied along the entire impact pathway. Perhaps our attempt to respond to earlier comments and explain how we will achieve significant outcomes and long term impacts has overshadowed the explanation of the science that WLE will deliver. Here, it is critically important to unpack the elements of the ISPC comments.

To be effective, WLE must do cutting edge disciplinary biophysical and socioeconomic research plus translational interdisciplinary research, with a strong emphasis on feeding research results into national, regional and global multi-stakeholder dialogues and discourses and promoting incentive frameworks for uptake. These roles are critically important, complementary and necessary. WLE's proven capacity to combine these roles through its multiple partnerships is the basis for our unique comparative advantage.

An example that shows how WLE's comparative advantage can be brought to bear on key NRM challenges is on India's national policy of subsidizing the purchase of solar pumps. While there are substantial potential benefits from replacing existing pumps with solar pumps, there is also a high likelihood that their widespread adoption under existing policies will exacerbate the depletion of India's aquifers through even greater over-pumping. The long term consequences would be catastrophic. Therefore, during Phase 1, through its LWS FP, WLE researchers stepped back from "normal" water management research and examined the water-energy-food production nexus from a sustainability perspective. Based on this, WLE scientists proposed policy solutions that would enable farmers to sell their surplus solar power to the electricity grid, thus creating incentives to limit pumping to what is strictly necessary and receiving an income for selling electricity. Several variations on this solution are being tested and/or implemented in at least two Indian states, as reported in WLE's 2014 and 2015 Annual Reports.

Science and innovation agenda. The ISPC requests clarification of WLE's "science, technology, and innovation agenda (particularly for FP1, FP2 and FP4)". As amplification of the descriptions in the research questions and key outputs for each Cluster of Activities (CoA) in the proposal, we highlight here a few examples for each of the three Flagships mentioned.

WLE's program is distinguished from traditional farm-level technology research by its broader perspective from project level up to watersheds and landscapes. Rather than stopping at the identification of what will be the benefits and costs of an intervention at farm level, WLE asks what will be the implications for the sustainability of natural resources and ecosystem services as well as poverty reduction and achieving social equality if particular packages of technologies or management practices are implemented at scale. This is central to the science agenda. Further, WLE adapts or develops data, models and analytical decision-support tools that scientists, implementers and policy makers can use to answer these broader agro-ecological questions; identifies opportunities for cross-sectoral win-win solutions; and works with partners to identify and test innovative landscape- and watershed-level interventions. This work cannot be done through single-disciplinary research; it requires interdisciplinary research teams asking and answering research questions that cross-cut and often transcend single disciplinary paradigms. These points are illustrated with selected examples in the following FP-specific discussion.

FP1 (RDL). As noted in the proposal, WLE's CGIAR partners have developed a wide range of technologies for restoring degraded lands during decades of research on crop, soil, biodiversity, land and forest management in every region of the developing world. Restorative farming systems incorporate crop rotations, conservation agriculture, agro-ecological principles, and integration of trees, grasses and forests in production landscapes. The science and innovation agenda here is not to further refine specific

technologies; rather, it is to identify which combinations of technologies and practices are most appropriate in given conditions as a basis for developing investment portfolios. We do this by assessing the benefits and costs of interventions at landscape level and modeling and quantifying on- and off-site ecosystem services impacts of various technology combinations. We prioritize overcoming barriers to adoption and implementation. Identifying these barriers and potential strategies to overcome them is an important RDL research topic. For example, working with the ESA FP, RDL will deploy advances in decision science to analyze the costs, benefits and risks associated with different intervention options, including social, economic and biophysical factors, from the perspective of different stakeholder groups.

RDL is working with partners from the conservation, development, and agricultural domains to develop ecosystem service models that facilitate trade-off analysis between restoration actions and multiple ecosystem services and yield; and which further articulate these outcomes as measures of human well-being. Testing the impacts of large-scale soil restoration actions on water quality and energy production will also continue in Phase 2.

In 2015, the CGIAR signed a MoU with three French scientific institutions to undertake research to support the *4 per 1000 Initiative*, promising to address the soil science questions and implementation issues to build soil carbon for food security and climate change mitigation. There is still controversy on the achievable amount of soil carbon storage, and on how to include soil carbon in measuring, reporting and verification to achieve investment/policy change. RDL will focus on critical research areas needed to support these initiatives, for example by measuring carbon, considering all the costs, benefits and risks in tropical systems, and evaluating the costs, benefits and risks of various carbon building innovations. The work will also include further advancing risk and outcome indicators, including hydrological and gender-disaggregated socioeconomic factors. With the CCAFS, Livestock, FTA and DCL CRPs, this work will advance our understanding of the long-term impact of various interventions on soil organic carbon, soil health and associated food security, food system resilience, and adaptation to climate change.

Finally, RDL will advance the science of land evaluation, and develop analytic techniques in association with new technologies such as Unmanned Aerial Vehicle (UAV)-based land and crop monitoring, digital soil mapping, and chlorophyll fluorescence as a measure of crop photosynthesis and near infrared spectroscopy as a measure of soil properties. This work supports agronomic and AFS CRP programs, for example MAIZE and cassava (with RTB). Emphasis will include further advancing risk and outcome indicators, including hydrological and gender-disaggregated socioeconomic factors. Under the Africa Soil Information Service, advances in soil-plant spectroscopy, remote sensing and machine learning are being combined in new ways that is changing the way soils agronomy is conducted, providing evidence- and risk-based high resolution information to stakeholders at different levels. The work on projection of land health risks is complementary to on-going global efforts to track land degradation and restoration, and will emphasize new probabilistic quantification of risk factors associated with land degradation, leading to new early warning indicators of whether land is on an improvement or degradation pathway.

FP2 (LWS). LWS will address the challenges of taking agricultural land and water management (ALWM) technologies to scale in both irrigated and rainfed systems. The research will document how communities and institutions implementing and investing in ALWM can sustain and benefit from such improvements at a landscape scale through enabling policy measures, improved investments, and capacity strengthening. Through CoA 2.1, LWS will develop scientific understanding, including new knowledge to

support policy measures and investment opportunities, to sustainably scale out ALWM innovations in order to transform smallholder farming.

LWS will assess the opportunities and potential impacts of piloted technologies of today and emerging innovations of tomorrow, alongside social-institutional solutions in research projects that have contributed to, or are part of, the current LWS Flagship. These projects include the Comprehensive Assessment of Water Management in Agriculture, the IWMI-Tata Water Policy Research Program, IWMI's work on large-scale irrigation in Asia, and the AgWater Solutions project, which were identified by a [2015 SPIA study](#) as promising and innovative for impact assessment.

In collaboration with AFS CRPs, LWS will co-develop research on ALWM technologies and solutions for sustainable intensification of small scale irrigation and poverty alleviation. Some of this work is supported by the US government's Feed the Future⁴. Technologies such as ICT for smallholder farmers to help manage water and soil capital are also emerging as particularly promising to attain both water productivity gains and improved yields

Improving the performance of medium- and large-scale publicly managed irrigation systems is a long-standing challenge for local and global food systems. Through CoA 2.2, LWS will work on transforming their performance and unlocking potential **agro-ecosystem** services by applying business-like approaches to transform delivery of irrigation services. LWS will also develop and test innovative management approaches. We will further strengthen linkages with private sector actors (water user groups, agribusiness, and ICT providers) to address calls from national and international finance and planning agencies for more productive, equitable and sustainable irrigation services. The WHEAT, Livestock, and RICE CRPs have expressed strong interest in integrating better land and water management practices within specific value chains such as dry season seed and fodder production, and introducing new varieties acclimatized for tropical conditions as well as potentially profitable niche crops.

FP4 (VCR). Through CoA 4.1, VCR will co-design, together with CCAFS and the AFS CRPs, basin-wide and regional solutions to: 1) reduce agricultural losses due to floods and droughts; 2) enhance agricultural water availability through new sustainable approaches to water storage; and 3) increase the livelihood benefits that water storage provides. Some examples of the type of research to be undertaken include:

- Design of strategies/technologies/policies that simultaneously reduce damaging flood flows and enable sustainable expansion of groundwater use for irrigation, e.g. through managed aquifer recharge at times of flood flow (focus on the Ganges river basin [Bangladesh, India and Nepal] and Southeast Asia).
- Use of remote sensing to provide water resource managers with essential information needed for resource management during both floods and droughts. This will include alerts when crucial thresholds are reached. This work will be done in collaboration with the CGIAR Big Data and ICT Coordinating Platform (priority countries include Ghana, selected parts of East Africa, South and Southeast Asia).
- Co-design of flood and drought weather index insurance schemes that work for smallholder farmers to safeguard against flood and drought losses (focus on South and Southeast Asia).

⁴ Examples include the [chameleon soil water sensor](#) and the [wetting front detector](#).

- Moving beyond a single use (e.g. electricity production) to managing water storage reservoirs as features of the landscape that can provide local people (including those who may have been relocated as a consequence of dam construction) with a range of livelihood benefits (focus on West Africa [Ghana], East Africa [Nile] and Southeast Asia).
- Identification of areas most suitable for crops with various levels of drought tolerance (e.g. rice and wheat) and, in the case of rice, various levels of submergence tolerance (South Asia).

Through CoA 4.2 and working with AFS CRPs and other partners, VCR will carry out detailed studies and develop solutions for managing water allocation in the context of increasing competition and ever-more critical trade-offs. Some examples of the type of research to be undertaken include:

- Collaborating with the FISH CRP, identify and determine how best to minimize and manage water-related trade-offs between different sectors, such as those between hydropower and fisheries (Greater Mekong and Zambia).
- Develop management strategies/options for “portfolios” of grey and green infrastructure to achieve better outcomes for the multiple goals of poverty reduction, water-food-energy security, biodiversity conservation and climate resilience (Greater Mekong, Nile, Niger/Volta).
- Determine the water resource and food security implications of solar versus traditional energy development at basin and country scales (South Asia).
- Develop institutions that enhance the role of groundwater in reaching the SDGs and empower smallholder farmers (women and men) to manage groundwater and use it sustainably for their livelihoods and food security (sub-Saharan Africa).
- Identify and determine how to implement water-energy-food nexus solutions in those regions where win-win solutions are feasible (for example trading food and energy rather than water across the countries of the Eastern Nile, in the SADC region, and across Bangladesh-Nepal-India).
- In conjunction with the WHEAT, RICE and MAIZE CRPs, identify hotspots (competition, overdraft, pollution, energy variability) and ‘sweet spots’, where land, water and energy resources are conducive to sustainable intensification of relevant AFSs (South and Southeast Asia).

Response to comment on scope of technical expertise. First, we must emphasize that the lead center, IWMI, was never specialized on “limited technical fields”; its strength from its inception has been applying inter-disciplinary analysis to difficult water management challenges. IWMI has continuously evolved over the years to address the broader challenges related to water beyond irrigation.

Second, while IWMI’s own strengths have expanded in recent years, the Institute is only one among several major CGIAR and non-CGIAR institutional partners in WLE. Therefore, WLE’s comparative advantage does not rest on the capacities of any single institution; rather, its unique capacity is its partnerships with a diverse set of partners each bringing well-established skills across a wide range of natural resource issues, with the totality being far greater than the sum of its parts.

Third, WLE is not primarily in the business of doing narrowly-defined “technology” research. Other institutions have a stronger comparative advantage in researching how to improve the performance of technologies like drip irrigation systems and solar pumps, or inventing new water and soil

management techniques. Further, WLE is not primarily focused on the performance of technologies and practices at field or farm level: that scale is the remit of the AFS CRPs and other technical research institutions. Rather, another aspect of WLE's comparative advantage – through its partnerships with institutions having multiple capacities – lies in its capacity to identify existing and emerging opportunities for synergies and innovations in different contexts at project, landscape, watershed and agro-ecological zone levels through inter-disciplinary contextual analysis. Technologies are embedded in and reproduced through their social-institutional-political-cultural-economic contexts; the challenge, as demonstrated in our earlier work, is to identify innovations that have the potential to sustainably and equitably increase the productivity of agro-ecological systems *as systems*, while minimizing their negative externalities and unintended consequences.

Put differently, *the solutions that WLE produces with partners involve a combination of existing and emerging new technologies, social-institutional-political-economic-ecological analyses, development of new data, tools and models to do these analyses and support decision-making in complex contexts, and engagement with investors, policy makers and others to facilitate scaling up and out.* These strengths are illustrated in WLE's recent 2015 Annual Report to the CGIAR. Where appropriate, WLE will continue to support the development and scaling of particular emerging technologies and practices that are especially relevant to our key impact pathways. Examples of the latter are solar pumps and wetting front indicators.

- c) **The ISPC requests WLE to provide in the addendum details on the scientific expertise within the CRP on the issues of process and intermediation, as well as its comparative advantage in dealing with these issues.**
- d) **Further information on the types of scientific knowledge and impact pathways that will inform the “influence agenda” and shape institutions, including an increased awareness of trade-offs and uncertainty across scales and priorities as part of the recognition of the complexity of systemic change should also be provided in an addendum or rewrite of relevant sections.**

Note: These requests, combined into one request on page 5 of the commentary, are presented as two separate bullets on page 2. Given their inter-connection, we provide a combined response here.

Interpretation:

The discussion of these points is under the headings, “Theory of Change and Impact Pathways”, and “Crosscutting Issues” (the latter with subheadings on “Gender and youth” and “Enabling environment”). We agree that this constitutes a critically important set of issues revolving around both WLE's understanding of the kinds of scientific capacity and knowledge needed to promote positive changes given the complexity and uncertainty of agro-ecosystems, and whether WLE has the necessary scientific expertise to be confident of its comparative advantage. These points are raised in various forms in the comments on some FPs as well. Among other points made, the ISPC suggests reconsidering the Gender and Inclusive Development (GID) theme in favor of embedding social scientists in the FPs playing a central role in planning and executing research; and providing more detail on how WLE plans to deliver “impacts on a landscape scale”. This is related to other comments such as a concern that the obstacles to change are not outlined clearly, that the proposal is not sufficiently clear on the specific actions WLE will take to achieve outcomes, and there is a “need to identify who the decision makers are”. We believe this can be boiled down to explaining what is WLE's scientific capacity and knowledge to promote change given the

complexity of agro-ecosystems; and providing more details on its strategy to facilitate such change, i.e. to operationalize its TOC.

Response:

Scientific expertise and knowledge, and WLE's comparative advantage in understanding and promoting change. WLE has a strong track record in analyzing the sociology and political economics of agro-ecosystem and NRM issues, identifying key partners and effective strategies to promote changes in policies and investments, and achieving significant outcomes. WLE through its partners has a deep pool of social and political scientists and institutional economists with well-recognized expertise. These include Alan Nicol, Diana Suhardiman, Barbara van Koppen, , Tushaar Shah, and Katharina Felgenhauer (IWMI); Nicoline de Hann (WLE-recruited); Claudia Ringler, Wei Zhang, and Ruth Meinzen-Dick (IFPRI); Ravi Nijbroek, Christophe Bene, and Guy Henry (CIAT); as well as expertise within our university partners, for example UNESCO-IHE (e.g. Margreet Zwarteveen). In addition, and equally important, WLE partners have demonstrated expertise in facilitating and implementing policy decisions, most notably through the co-leader of the RUL FP (RUAF Foundation) as well as the following: the WLE-supported IWMI-Tata program in India (Tushaar Shah, IWMI), the WLE-Greater Mekong program (Kim Geheb, WLE-recruited), and the Nairobi Water Fund (Fred Kizito, CIAT). CVs for these scientists are available through Annex 3.7 of the WLE proposal.

WLE recognizes the need to further strengthen its expertise on the relevant processes and intermediation. To this end, WLE has increased its engagement with PIM, which will be a strong partner in Phase 2. As described in Annex 3.6, WLE through its RDL, LWS, VCR and especially ESA FPs, will engage closely with PIM, especially its Flagship 1 (Technological Innovation and Sustainable Intensification) and Flagship 5 (Governance of Natural Resources), which among other things will focus on the application of political economics across the portfolio. Ruth Meinzen-Dick, Alan Nicol and other WLE scientists are active in PIM's FP5. To further strengthen WLE's capacities, we have partnered with institutions with recognized expertise and experience in promoting change. These include UNESCO-IHE and Wageningen University, with specific complementary competencies in the discovery phase and capacity development, and the [RUAF Foundation](#), [Kilimo Trust](#) and [MetaMeta](#) as examples of partnerships in the piloting and scaling out phase.

A specific example of jointly promoting change that is being piloted in 2016 is an effort by PIM, A4NH, CCAFS and WLE to define a shared policy agenda and coordinate policy-oriented research during Phase 2 starting with Bangladesh and Ethiopia — site integration countries where these programs have significant engagement. The plan is to review key strategy documents for agricultural growth, nutrition, climate change, and water and land management, to identify the core actions envisaged and the policy implications of each. Putting these together will help us see where our potentially separate policy analysis should overlap, and what we should pursue jointly.

Annex 3.1 provides details on the large number of partnerships WLE has established, for example with IFIs such as IFAD, World Bank, and African and Asian Development Banks, international organizations such as FAO and other UN agencies, regional intergovernmental economic and political organizations such as SADC, NGOs, and government policy makers. WLE is pleased that the ISPC recognizes the strength of our partnership strategy, noting its “well-developed appreciation and understanding of the many and varied partner relationships, including linkages to regional and global policy initiatives” (page 6).

WLE's strengths in this area include a combination of experience in implementing excellent research, and facilitating the engagement of stakeholders with the implications and possible solutions to complex problems emerging from that research; a deep pool of excellent and highly respected social, economic and institutional scientists; an equally strong pool of people with demonstrated capacity to promote significant policy changes and investments, many with long-term engagement in the CGIAR priority countries; and strong and enduring partnerships with a wide spectrum of institutions. Together, these form the basis for WLE's considerable comparative advantage.

Operationalizing the TOC. The ISPC commentary raises this issue within its discussion supporting the concern regarding priority-setting and integration among FPs and with other CRPs. Although the ISPC did not require a specific response to this concern, WLE wishes to respond briefly. First, WLE builds on over a decade of experience with, and learning from, the use of Theory of Change (TOC) concepts and impact pathways. The Challenge Program on Water and Food was a pioneer in their use. Over time, we have become more proficient in developing and – more importantly – using our TOC as a roadmap to help us achieve outcome targets. The ISPC's comments on both WLE's Phase 2 pre-proposal and full proposal explicitly recognize this progress. We are well aware that promoting change in complex agro-ecological-social-political-economic systems is very challenging: not only is there inertia in such complex systems, and serious risks of unintended consequences, but there are strong vested interests which resist change, or promote trajectories that may well accelerate degradation and social inequity.

But our experience also demonstrates that it is possible to make significant contributions to promoting positive reforms and innovations that have the potential to improve sustainability, productivity, and human-wellbeing. We do this through a number of strategies. Our effective communication and knowledge management strategy, as described in Annex 3.10, plays an important role. Our engagement with multiple partners, stakeholders, decision-makers, and others, is the most important strategy for promoting change. As explained in detail in our Partnership Strategy (Annex 3.1), we have built strong relationships with policy makers, development agencies, financial institutions, and others that gives us a place at the table and a voice on critical NRM issues.

Two recent examples of significant outcomes achieved by WLE are reported in the 2014 and 2015 Annual Reports to the CGIAR. Briefly, these are: 1) scaling up of improved sustainable land and water management policies and implementation strategies in Ethiopia; and 2) setting up of a Water Fund to promote sustainable management of watersheds in a Kenyan river basin.

Finally, as emphasized in WLE's Phase 2 proposal (pages 7-10), the TOC provides a conceptual framework which we view as a hypothesis on how we our research will lead to desirable outcomes and impacts. WLE will review the efficacy of this framework regularly and revise it as needed. Annex 3.5 explains WLE's results-based Monitoring, Evaluation and Learning (MEL) system. The MEL system will facilitate systematic assessment of our progress towards achieving our planned outcomes and impacts.

Implementing gender research. In response to the idea of reconsidering the GID theme and embedding a social scientist in each FP, Annex 3.3 of the proposal (Gender Annex) explains that WLE does indeed plan to embed a gender social scientist within each FP to ensure that gender, youth and poverty issues remain at the core of the research. The function of GID is to provide overall technical support, guidance and coherence on gender issues, lead the synthesizing of lessons learned from all of the FPs, and provide a focal point for portfolio-wide gender discussions which PIM will lead.

e) *Elaborate upon the justification for prioritizing RUL in the CRP as well as a discussion of the comparative advantage of CGIAR in this area.*

Interpretation:

This request is elaborated in the commentary on the Rural-Urban Linkages FP (FP3). The discussion states that WLE presents “a strong argument for the CGIAR to invest in peri-urban agriculture and the efficient use and re-cycling of resources in peri-urban contexts” – but then adds that “the justification for its prioritization in this CRP needs further explanation”. It goes on to say that “a clear justification for prioritizing areas such as the development of ‘foodshed’ planning and the analysis of urban supply chains in the CRP work” is lacking. The paragraph concludes with the statement that “Likewise, the comparative advantage of the CGIAR in this field of work is not obvious”. The ISPC recommends that WLE consider including livestock waste in its work. There are other comments in the discussion of RUL which we will take into consideration during the planning process.

Response:

We note the ISPC’s very positive comments in its review of WLE’s pre-proposal as well as the very positive IEA review of the RUL FP. In its review of the pre-proposal, among other comments, ISPC noted that this FP is “both more practical and more implementable” than other FPs, and several times reiterated its view that “CIAT and the lead center [IWMI] have a reasonable claim to have comparative advantage on these issues [i.e. rural-urban food linkages] within the CGIAR”. We understand the ISPC is seeking more clarification of the expansion of the RUL work in Phase 2.

WLE’s inclusion of a flagship on Rural-Urban Linkages is a result of the growing importance of urban and peri-urban areas for the overall sustainability of agriculture and food systems, which has been stressed by a number of partners and by the ISPC itself. Rural and urban landscapes can no longer be treated separately; they are increasingly intertwined, and their effective sustainable management requires an integrated systems approach. The natural resources needed to feed growing cities and the management of related waste will be decisive for the future of agro-ecosystems in rapidly growing developing countries, especially those in South Asia and Sub-Saharan Africa; yet to date it is given little recognition in the CGIAR portfolio as a whole. In addition, the growing amount of untreated waste produced by rapidly urbanizing areas constitutes both a major threat to the long term sustainability of peri-urban and rural ecosystems and indeed to staying within the limits of the planetary nitrogen cycle, but also offers an opportunity to recycle wastes into fertilizer. This will be win-win, by reducing the footprint of chemical fertilizers while also minimizing the volume of untreated urban waste.

WLE has a clear comparative advantage among the CRPs in its focus on natural resources across scales, i.e. its application of a landscape perspective, which facilitates looking across commodities and sectors at solutions with minimal trade-offs. With urban centers being increasingly the focal point of resource consumption, poverty and ecosystem degradation, and powerful urban stakeholders making decisions on inter-sectoral resource allocations, it makes sense to give the sustainability of rural-urban linkages a significant weight within WLE. We are building on our extensive experience in resource recovery and reuse (RRR) developed over the past decade. This experience has been recognized by global awards and is in demand from major UN and development agencies. Therefore, we argue that urbanization-related challenges and opportunities need to be prioritized within the CGIAR to include more research on rural-urban linkages in the global South. The majority of the poor already live in urban spaces in many parts of

the world, and in others will do so in the coming decade. Therefore, we consider it to be very important that the CGIAR develops more related expertise. The WLE-RUL partner network, e.g. with UN-Habitat, is well positioned to lead this endeavor.

The development of research around rural-urban food flows, food waste, and “foodsheds” (similar to watersheds) was suggested by our partners FAO and RUAF, as a first entry point into Rural-Urban Linkages. We also work jointly on methodologies which can also be applied in data-scarce environments, an understudied territory so far. In collaboration with northern and southern universities having significant technical expertise, we are currently defining boundaries for urban regional food systems and analyzing strategies for increasing the resilience of urban food supplies. This research cuts across scales and commodity value chains, complementing what individual AFS CRPs do.

WLE plans to continue two key areas of emphasis from Phase 1: a) food waste as a resource for soil rehabilitation (supporting RDL), and b) rural-urban water competition and allocation (supporting the VCR flagship), including safe wastewater use. In both areas, the CGIAR can demonstrate a clear comparative advantage as a global leader based on our research output (e.g. safe wastewater irrigation and RRR business models, via IWMI, documented in over 100 publications; see <http://www.iwmi.cgiar.org/issues/wastewater/publications>), IEA feedback, our WHO advisory status, and our status as a key partner with expertise in the global South (CIAT, IWMI) in emerging research areas such as City Region Food Systems.

Finally, we fully accept the recommendation to consider livestock waste and as discussed in Annex 3.6, this is already contemplated in East Africa with the Livestock, and Agriculture for Health and Nutrition (A4HN) CRPs.

3. Responses to Other Comments

Response to ISPC comments on the ESA Flagship:

In its discussion of FP 5 (ESA), the ISPC commentary raises questions regarding the feasibility of this flagship, offering a combination of positive comments while expressing some concerns. It states that the TOC is key to understanding whether ESA will achieve its planned outcomes, based on a perception that it relies on intermediary organizations with a “weak delivery and impact record”. ISPC agrees the ESA concept “should be mainstreamed through the CGIAR” but questions whether it is feasible for one “free standing FP”. The commentary concludes by inviting WLE to address these concerns in its discussion of the types of scientific knowledge and impact pathways that will inform what ISPC refers to as its “influence agenda”.

We agree that there is significant breadth to the work planned by ESA. Indeed, this reflects and responds to the overall ambition of the CGIAR SRF and the entire portfolio. However, ESA is not a “free standing FP”. Rather, in developing Phase 2, considerable emphasis has been placed on closely linking ESA to the four thematic WLE FPs, as well as with specific AFS CRPs. Its role is to provide integrative tools and metrics that will permit testing impacts of innovations at scale. To accomplish this, ESA has already achieved two critical milestones: 1) it has assembled a network of interdisciplinary specialists and systems modelers specifically to develop these tools; and 2) it has negotiated direct partnerships with the RICE, DCL, FTA, and Livestock CRPs for joint collaboration on scaling questions. While these scaling questions can be interpreted as broad, they become very precise when focusing on AFS interventions in specific

geographies (e.g. soil conservation practices in Ethiopia, small scale irrigation in Ghana and Burkina Faso, testing of new rice varieties in Vietnam). ESA will roll-out its work beginning with RICE and FTA. Locations selected by the Flagship prioritize those geographies that are in the site integration framework, and/or shared WLE and AFS landscapes, in order to leverage advances and partnerships made in Phase I of the CRP.

WLE does not agree that the ESA partners have a “weak delivery and impact record”. As emphasized in the proposal, in Phase 2 ESA’s main partners are the AFS CRPs which in turn have strong national and local partners. In addition, ESA will work closely with strong research institutions such as Hubbard Decision Research, Queen Mary University of London’s Center for Development Research, and partners with strong scaling out capacities such as FAO and international finance institutions.

Response to comments on mobilizing scientists’ time:

In several sections of the commentary, the ISPC seeks assurances that WLE will mobilize sufficient time from its top systems scientists. Clearly, the amount of scientists’ time that is devoted to WLE work is a function of having adequate financial resources to pay the costs. In some cases, for example RDL, the key named scientists are dedicated full time to WLE through combinations of W1&2, W3 and bilateral funding. All RUL scientists are dedicated full time to WLE as all IWMI scientists working on its “Resource Recovery, Water Quality and Health” theme are by definition working on this FP. In other cases, core scientists (e.g. those leading FPs) will be allocated sufficient funds to spend a minimum of 20% of their time on WLE, mostly to provide intellectual leadership. This will be significantly increased where they also lead W3 and bilateral projects that are part of WLE.

Response to comment on budget:

On page 5, the ISPC commentary states that “the CRP amount indicated for ‘Management & Support Cost’ is 1.8% of the total budget. This is relatively small for such a complex program. Clarification on the amount of funds allocated to management and support within FPs is needed, as is a breakdown of the percentage of the budget allocated to fieldwork and primary data collection.” Our response is as follows:

- First, the ratio of Management & Support Cost appears to have been incorrectly calculated. The proposed CRP budget totals \$354,687,000, and the 6-years Management & Support Cost totals \$11,015,000, which is 3.1% of the budget. IWMI has followed the CRP2 guidelines for categorizing Management & Support costs, with the inclusion of funding for CRP-level components of Monitoring, Evaluation and Learning and Communications and Knowledge Management. Wherever possible, costs specific to or directly associated with a FP have been included in the FP budget.
- Second, funding for approximately 0.4 FTE of a Senior Scientist position has been budgeted for site integration management through the ESA FP, to a total of \$270,000 over 6-years.
- Finally, funding for the GID coordinator and a postdoctoral fellow has been budgeted partially into each FP, to a total of \$400,000 over 6-years.

Response to Consortium Office comments on WLE’s IA and OA/OD plans:

The Consortium Office provided very positive observations on WLE’s intellectual assets (IA) management and its Open Access/Open Data (OA/OD) policies. WLE appreciates these observations, as well as the

suggestions made to provide further clarifications, particularly on the reporting lines and budget allocation to OA/OD, which the CO considered this to be on the low side. To respond, our intent is to include OA/OD budgets in the bilateral projects at the same level as allocated in the W1/W2 budget (i.e. 3-5%). In regards to reporting lines, when working on WLE-related matters, staff from the lead center will be accountable to the WLE Management Committee and will work closely with the Operations Team. This arrangement worked well in Phase 1. In addition, for both areas, capacity development and networking between partner organizations will be implemented.

4. Conclusion

We trust that our responses to the five issues on which the ISPC requested clarification and details have fully addressed the concerns expressed. WLE will be happy to provide any further information that is required. We are very pleased that the ISPC has acknowledged the progress WLE has made since submitting its first pre-proposal. This progress is largely the result of our responding to the issues and questions posed by the ISPC, which have enabled us to develop a more coherent program that we believe will make significant contributions to achieving the SRF goals. As the ISPC commentary states, it is inconceivable that the CGIAR portfolio not include a strong research emphasis on water, land and ecosystems. The ISPC has made the case eloquently in the following paragraph from page 2 of the commentary:

The ambition of WLE is central to the SRF and IDOs. It addresses a grand challenge that underpins the entire CGIAR – it covers areas that have been under-invested by the CGIAR in the past. Therefore, it is appropriate that it is an integrating CRP. WLE responds to the intention behind the CGIAR reform process in trying to apply the best research to the world’s emerging NRM problems. WLE is connecting to the world’s leading scientists in high priority fields where the CGIAR has been largely absent in the past. As a GIP CRP, it takes seriously its intended role of providing a pathway to enhance delivery of the System as a whole into key policy areas in the WLE field.

As described in the proposal and further emphasized in this Addendum, WLE is building strong partnerships with AFS and GIP CRPs, as well as with many partners outside the CGIAR. We see these partnerships as absolutely necessary and critically important if we are to achieve our planned outcomes and impacts; and as equally critical to enable the CGIAR’s ambitious portfolio to deliver fully on its targets. WLE’s program is highly integrated, with synergies and complementarities among its flagships, such that the whole program is greater than the sum of its parts. Therefore, it is very important to maintain the coherence and unity of WLE to enable it to achieve its planned outcomes and impacts.

WLE is building on its predecessor programs, especially its first phase, which gives us a head start in demonstrating significant outcomes in the next few years. We have also used the first phase to strengthen our expertise and research programs in several areas, for example gender analysis and the application of new decision-support models and tools. WLE is also addressing new challenges that have not been adequately addressed in the past, and is developing new partnerships to enhance its capacity to deliver on these promises. We are committed to work with all our partners effectively and efficiently to deliver on our planned outputs, outcomes and impacts.

Annex: List of Changes in the WLE Proposal

Main proposal text (volume 1)

No major revisions were made in the proposal. However, aside from minor editing, a few small changes were made to increase its clarity, as follows:

Page 14 (section 1.0.4): A paragraph has been added explaining the planned outcomes of WLE's gender research.

Page 27 (section 1.0.11): At the bottom of the page, we have updated a paragraph to say we have now fully complied with IEA recommendations to update terms of reference of all governance and management entities, and have also updated the Accountability and Responsibility Matrix.

On pages 49, 50, and 52 (section 2.1.1.6), we have made the planned outcomes of the RDL CoAs more explicit.

Page 103 (section 2.3.1.9): One additional sentence was added to emphasize RUL's planned gender outcomes.

Pages 116-117 (section 2.4.1.3): Clarified and strengthened the discussion of VCR's ToC.

Pages 122, 124 (section 2.4.1.6): Made minor improvements in how CoA 4.1 research questions are stated, and sharpened the CoA 4.2 research questions.

Annexes (volume 2)

Page 196: in Annex 3.4 on youth, we have strengthened the statement on planned outcomes.

Page 212: We have updated Template 3.6.1 in Annex 3.6 on linkages with other CRPs to include developments that have occurred since the original proposal was finalized. These are PIM-RUL, MAIZE-LWS and WHEAT-LWS activities.

We have updated Annex 3.7 on staffing to include additional social scientists.