



Submission Document – Nile Project 3

Format for submitting a project proposal

Basin Development Challenges of the CPWF

July 2009

SUBMISSION DOCUMENT

Please read endnotes for instructions for filling in this submission

Please read the full description of the BDC research program before beginning

Fill in the text boxes and tables to complete this application. Only information provided in the text boxes and tables will be sent to the reviewers

1. Basin Development Challenge:

NILE: A LANDSCAPE APPROACH TO RAINWATER MANAGEMENT IN ETHIOPIAⁱ

2. Project:

On targeting and scaling out (Nile BDC Project 3)

3. Project Data

Duration: 2 years

Target start date: January 01 2010

Finish date: December 31 2011

Maximum budget requested from CPWF: 1 Million USD

Any matching funds offered (provide brief explanation):

IWMI will provide through work planned under the Agricultural Water Management Landscape Analysis project funded by the Bill and Melinda Gates Foundation 400,000 USD matching funds. This will be through planned literature review of existing small scale technologies (a.o. rainwater harvesting technologies), development of the Rapid Participatory Opportunities and Constraints Analysis, planned policy dialogues through which results of this project can also be presented and other dissemination opportunities.

4. Project Deliverable

Identification of biophysical and institutional conditions affecting suitability of RWM strategies

5. BDC Goals to which the Project will contribute

If this Development Challenge is successfully met, innovative RWM systems will have been developed and implemented at landscape scales across agroecosystems in the Ethiopian Highlands. These will address the exploitation of rainwater across landscapes, and appropriate rainwater harvesting technologies will be deployed, maintained and monitored. These technologies will have been identified, and matched to local rainfall conditions, soil types and topography. At research sites, associated small-scale irrigation techniques that allow farmers to draw on their rainwater to irrigate crops during the dry season will have been identified and implemented. The management system will enable farmers to exploit rainwater for multiple uses, including livestock, to complement crop-based incomes. Overall landscape water productivity will improve, and soil damage minimized. Policy and administrative changes as a result of project findings, which yield greater focus on RWM in the Nile River Basin, in part through the Nile Basin Initiative, will have occurred. In low rainfall areas, economically useful trees, for commercial, food or

fodder purposes, will have been identified and adopted. The RWM system will be have been developed with local (formal and communal) institutions, which will in turn work to implement and maintain it. The success of the management system, and the clear impact that will have resulted, will prompt its uptake by government and development agencies leading to the widespread implementation of the system across the Nile River Basin.

6. Links with other projects in the Basin Development Challengeⁱⁱ:

The project will need to work with other projects in the BDC to contribute to a coherent research program that is lead by a Basin Leader. In particular this project will need to work very closely with Project 2 in iterations of hypothesis development and testing on technology targeting and strategies for scaling out.

7. Project Summary

This project is about matching technologies (or whole strategies) with environments. It has been shown that “blanket” RMS are often inappropriate. One size does not, as they say, fit all. Strategies for upper slopes are likely to be different than those for lower slopes. The suitability of technologies may be influenced by altitude, rainfall patterns, landscape position, soil type, access to input and product markets, crop-livestock interactions, the extent of community integration, the attitudes of local authorities, the presence of NGOs and other develop organizations – and many other factors.

This project will aim to identify the conditions – biophysical and institutional – that favour the use of particular sets of practices, then scan the landscape to find out where else these conditions prevail. That is, this project will help identify the “conditionality” of recommendations. Sometimes these conditions may be amenable to mapping, as when altitude is a determining factor. Some the conditions will be difficult or impossible to map, as when community integration is a determining factor.

NOTE: From this point on the text you enter into the text boxes should not add up to more than 6000 words. There is a suggested, not mandatory, word limit for each section. You have the flexibility to put emphasis where you think it is important.

8. Links to previous and ongoing work [800 words]

8.1 Previous and on-going work

What has been done to address the problem in the past and ongoing (by your partners, other researchers and in CPWF Phase one projects) that is relevant to implementing this project? Include in Section 16 a carefully selected list of relevant bibliographic references (normally no more than 10).

Under CPWF Phase 1 the following key undertakings have been made:
Project CP19 (Upstream–Downstream Impacts in the Nile) focused on improving land and water management in the Ethiopian Highlands and investigated the impact on downstream dependents of the Blue Nile. This project has schematized the Blue Nile

and developed the Blue Nile Atlas (Denekeew and Awulachew 2009), analyzed large scale water use and water allocations, studied productivity, erosion, and sediment transfer at selected locations. The project also analyzed the policy and institutions in Sudan and Ethiopia, identified certain innovations linked to payment for environmental services and studied the effectiveness of watershed management institutions. The maps and databases developed characterising the Blue Nile basin can be directly used in the proposed project.

Project CP37 (Increasing water-use efficiency for food production through better livestock management) focused on developing methodologies to analyze livestock production systems, and on identifying water use efficiency strategies and interventions that would minimize water depletion and improve positive impact on livelihoods, environmental health and resilience. The work identified the need to address RWM, and multiple use water systems, as well as the need for improved institutional arrangements and policies that foster these changes along with better integration of livestock, crop, and water management. The data collected, the maps created and the methodology developed to analyze livestock production systems and water use efficiency (Van Breugel et al, forthcoming) can be directly used in the proposed project.

Project CP59 (The Nile Basin Focal Project) aimed to identify high potential water management interventions within the basin, and to answer the key question “What are the opportunities to develop and manage water for agriculture in the basin in order to reduce poverty?”. The project has analyzed poverty, water availability and access, water productivity, and institutions and interventions at the basin scale. The linkages between water and poverty/vulnerability were investigated. Data on e.g. the drivers of poverty, crop and livestock productivity, and land degradation were collected and maps produced. In addition, a spatial delineation of the Nile basin in agricultural productions and hydronomic zones was carried out. The data and maps will provide base information for further detailed mapping and as a basis for scenario development, the development of extrapolation domains and for linking to targeting and out-scaling efforts.

More details on these three projects can be found at:

<http://www.iwmi.cgiar.org/Africa/East/PROJECTS/>

In addition, ILRI has been leading a project called Improved Productivity and Market Success for Ethiopian Farmers (IPMS). It has developed approaches in 10 Pilot Woreda (Districts) for appropriate knowledge management, capacity strengthening, and development of small-scale entrepreneurship (Moti et al., 2009).

IWMI is currently leading a project to identify promising Agricultural Water Management (AWM) interventions in Asia and Africa supported by the Bill and Melinda Gates Foundation (BMGF). The methodology developed within the framework of this project is based on a “Rapid Participatory Opportunities and Constraints Analysis (RPOCA)” approach for the collection and collation of data on

water management interventions. The database of intervention options (described in more detail in Section 10.5) will provide an invaluable input to the proposed project.

For more information see: <http://awm-landscape.iwmi.org/>

8.2 Lessons learned

What are the lessons or conclusions that can be drawn from this work?

Targeting and scaling up of agricultural interventions has been the center of much recent debate within research and development (R&D) institutions in the Ethiopian Highlands, especially those concerned with natural resources management (NRM). This interest has arisen in the context of several important developments in thinking about poverty and resources degradation: i) government, donors and civil society are increasingly emphasizing that money spent in R&D must bring about a lasting impact on the lives of the rural poor and minimize land and water degradation; and ii) the recognition that many relevant rain-fed technologies and approaches are not achieving their full potential impact because of low levels of adoption, particularly with knowledge intensive interventions. The same is true for most CPWF Phase I projects.

A growing demand for crop and livestock products drive an intensification process in the region. It is increasingly recognized that improving rainwater productivity for small-holders is a really important dimension in order to be able to participate in new markets. In the Blue Nile basin there are a range of diverse initiatives and projects to generate technologies and good practices that could benefit farmers, however there is lack of coordination and targeting. In the history of Ethiopian agriculture, various extension intervention programs have been implemented in the form of fully-fledged programs or as pilot projects. Unfortunately, the impacts of all of these development interventions, in terms of improving the lives of the rural population in general and the mode of farming and productivity in particular, are very low. As these interventions are typically technology-oriented and are not supported by effective policies and institutions, the anticipated goal of reaching poor communities and improving their livelihoods has not been yet achieved. Although there are technologies and practices developed by NARIs and CG centers, there is a gap in linking research with development and in addressing landscape challenges through integrated approaches. The recently increasing number of extension agents do not necessarily impact the agricultural systems due to a low capacity in understanding the mosaic of different landscapes.

9. Research questions [1000 words]

The following are the research questions that this project should address:

- If land were used for these purposes, and recommended rainwater harvesting technologies were adopted, what impact would it have on the basin's water flows?
- What RMS work best for which crops and in which parts of the Ethiopia highlands, given soil, topography and rainfall levels?

- How can livestock water productivity be mapped across the basin, and what practical measures can be taken to improve its productivity?

How will your research address these research questions?

RQ1: If land were used for these purposes, and recommended rainwater harvesting technologies were adopted, what impact would it have on the basin's water flows?

Under Output 2, baseline assessments of the bio-physical environment will be undertaken. These include water access, availability, and productivity. We will use information collected and produced in previous projects (see Section 8.1), and Nile BDC Project 2 and 4 in combination with secondary sources such as Ethiopia central statistics data, information from Remote Sensing and refinement of the hydrological modeling results. In addition, available RWM interventions will be reviewed and the conditions that favour successful implementation thereof identified. Following the methodology designed under Output 1, these options will be linked to extrapolation domains. Based on a synthesis of the available RWM interventions and stakeholder consultations, sets of best-bet and high impact options will be identified. This will involve matching the interventions to the biophysical environments, through spatial analysis related to key suitability parameters representing soil, topography, farming system, rainfall variability, water availability, and the socio-economic environment. Suitability maps of the high impact interventions will be produced and spatial recommendation domains defined.

Output 3 of this research proposal involves the analysis of the best land use systems for different parts of the basin in terms of water productivity, livelihoods and economic benefits. The activities listed under this output will enable us to answer RQ 1. A combination of existing datasets and newly collected data will be used to assess the impact of RWM systems on domestic water supply, on agricultural productivity as well as on e.g. soil moisture, erosion and downstream flows in catchments for different agro-ecological settings and of different sizes. We will quantify specific water balance components and parameters. We partition rainfall into green and blue water, and infer the impact of upgrading rainfed system with respect to the change in runoff coefficient, evapo-transpiration, direct run-off and base flow components.

RQ2: What RMS work best for which crops and in which parts of the Ethiopian highlands, given soil, topography and rainfall levels?

Building on the rich source of information produced during our previous work in the Nile Basin, the Ethiopian highlands will be characterized and mapped in terms of a variety of biophysical conditions including topography, soil types, farming systems, cultivated area and crop yield. Whenever possible, we will also build on other existing databases (e.g. Soil Conservation Research Programme and ETHIO-GIS, developed by CDE). We start with this activity in order to understand and characterize the variation in Ethiopian highland systems with respect to biophysical and socio-economic conditions. We use available tools and methods which can provide us high resolution information and data for clear understanding of the systems (Output 2).

At the beginning of the project we will bring together a wide range of stakeholders for a workshop. Following the methodology developed in Output 1, and with the

input from these stakeholders, we identify interventions that currently exist in the area or that are available elsewhere. We consider those interventions pertinent to RMS ranging from in situ water management to small scale irrigation and drainage systems. The research will make use of existing study catchments in a number of regions in Ethiopia, where RWM systems have been piloted (e.g. by ECWP and SCRP) to validate the characterization of these technical options.

The RWM systems will be matched to conditions on the ground through spatial analysis related to key parameters representing soil, topography, farming system, rainfall variability, water availability, and available technologies. Under Output 3, we identify best-bet interventions and develop scenarios. We use a combination of participatory research, evaluation methods and modeling to identify, prioritize and select interventions that have higher impact with respect to agricultural productivity. Based on the collected baseline information, socio-economic analyses and hydrological modeling, the likely biophysical and socio-economic impacts of the recommended interventions will be assessed. This will include taking account of predicted climate risks under projected future climate change.

RQ3: How can livestock water productivity be mapped across the basin, and what practical measures can be taken to improve its productivity?

The mapping of crop and livestock water productivity will be carried out by adopting the water productivity frame work developed by Molden et al. (2007) and Peden et al. (2009). These methodologies will be refined, and information such as Ethiopia central statistics data on cultivated area, crop yield, livestock population, and harvest indices used to map existing productivity levels and potential gains. The potential impacts of the available RMS on water productivity will be assessed under Output 3. Based on these results, recommendations about practical measures can be made. Maps of matching environments and recommendation domains for the high impact interventions will be produced.

10. Research Outputs, Methods and Uptake Pathways [2600 words]

10.1 Project research outputs (from MTP)

- A methodology for identifying what RMS work best in which parts of the Nile basin, and can be applied to other African river basins with the intention of improving livelihoods.
- Maps that identify what RMS work best, and where, in the basin, in terms of soils, topography and rainfall.
- An analysis of the best land use systems for different parts of the basin, in terms of water productivity, livelihoods and economic benefits.

What additional research outputs should the project produce, if any? What does the output(s) add to the BDC?

In response to the realization that technology interventions need the right policy support to ensure practical implementation and real impact (see 8.2 lessons learned), we widen the scope of Output 2 to include the importance of institutional

arrangements in the successful adoption of RMS. We will also take into account poverty and gender implications of technologies. We therefore reformulate Output 2:

Maps that identify what RMS work best, and where, in the basin in terms, of biophysical and institutional parameters.

10.2 Project partners

Who will you work with to produce the outputs listed above (list actors; be specific)?ⁱⁱⁱ

Output 1: Lead by IWMI - in partnership with ILRI, ARARI, ORARI, EWRHA

Output 2: Lead by ILRI – in partnership with IWMI

Output 3: Jointly lead by IWMI and ILRI – in partnership with ARARI, ORARI, EWRHA

As ILRI is leading the project, details are provided in Section 14.

IWMI is a key player in the field of water management research both globally and in the Nile Basin. The institute has a strong presence in the region, and has recently launched an important project to identify promising AWM interventions in Asia and Africa supported by the Bill and Melinda Gates Foundation (BMGF), an important partner for Output 1. IWMI and partners through the Comprehensive Assessment of Water Management for Agriculture, the AWM technologies inventory and poverty impact study in Ethiopia, for example, have developed methods and tools for identifying RMS, and are thus strongly placed to lead Output 1. IWMI has much previous research experience in the analysis of climate and rainfall and linkages to hydrology, and capacity to map and characterize watersheds, landscapes, and basins. IWMI is therefore in a strong position to conduct further work and to deliver outputs 2 and 3. Furthermore, IWMI's own partnerships and linkages with national and regional AWM policy makers, implementation and research institutions, NGOs and development partners as well as experience on the ground will ensure delivery of the outputs.

ARARI and ORARI - The Amhara and Oromia Regional Agricultural Research Institutes (ARARI and ORARI respectively) share the same value and serve the two biggest regions in the Ethiopian Highlands portion of the Blue Nile. These RARIs are responsible for developing technologies and practices relevant to local use, and in facilitating the extension services needed to upscale interventions to wider communities across their respective regions. They are key players in creating local partnership and influencing policy in rainwater management. They will be responsible for spearheading site-specific facilitation, field work, analyzing and ground truthing of land use and farming systems and conduction policy negotiation and linkages (Outputs 1 and 3). Through them the knowledge and policy reflection generated will be up scaled to regional government policy and strategies.

The Ethiopian Rain Water Harvesting Association (EWRHA) is an important partner in this project. They have established a network of professionals, civil societies and end users focused around water harvesting practices and technologies in Ethiopia. Their network provides ample opportunity to create partnership for communicating

results, to help validate findings, and to assist in targeting and out scaling results. These activities are pertinent to all three of the outputs.

10.3 Next users

Who are the next users of the outputs (list actors; be specific)?^{iv}

Outputs 1 & 2:

Universities (such as Addis Ababa, Gondar, Jima, Ambo, Haramaya, Debub, Makarrere, Nariobi, Dar-es-Saalam) and research centers can use the methods to undertake similar work in Ethiopia and the wider Nile Region. Policy makers from Amhara, Tigray and Oromia regions of the Blue Nile could use the methods to tailor policy interventions in order to facilitate adoption and dissemination. NGOs, particularly the local ones, can use the results to target specific communities and landscapes and MOARD and the Bureaus of Agriculture and Rural Development for policy development and management. Basin institution (e.g. NBI) and regional bodies such as ASARECA can apply the methods in similar land use systems in the basin and across Africa.

Output 3:

The Ethiopian government, with the support of donors, is developing two major development programmes; an Agricultural Growth Programme (AGP) and Water Centred Growth Corridors. The Growth Corridors are giving priorities to districts with high potential, following irrigation and other water availability as an entry point. Many other development partners are expected to follow the agenda of the government. Providing information on best land use systems would facilitate investment and improve efficiency of development actors in the Blue Nile. The Nile Basin Initiative (NBI) and investors in agricultural development in the Nile Basin region and such as Alliance for a Green Revolution in Africa (AGRA), bilateral and multilateral donors and private foundations will be able to make sure of the results of the project.

10.4 Learning required by next users

What will the next users of the outputs need to learn to use the research outputs?^v

Output 1:

Next users should learn to adopt the methodologies instead of re-inventing similar methods, thereby saving time and resources. They should learn to undertake comprehensive literature surveys, and to review what already exists in order to undertake specific research pertinent to their own situations. They should also learn to broaden the scope of their research beyond their traditional areas of focus. In order to use the developed tools, they need to also learn how to use such tools, and to maintain contact and work with the developers. The regional next users should also learn the derived methodology for analyzing and targeting of interventions for effective out scaling. Government and policy makers should learn that effective targeting and methods for doing so are important than making blanket approaches. They need to understand the importance of decision making tools and how to use them.

Output 2:

The next users of Output 2 need to learn how to read and understand the maps and spatial data, how to create (additional) maps in a participatory manner, and to utilize the maps for targeting interventions. The methods and tools should be integrated into their curricula for training of development agents. Regional organizations should also learn to utilize the generated information and products for their investments.

Output 3:

The next users need to appreciate and learn the needs and usefulness of targeting, understanding impact and learning how to adopt best practices. They should learn how to prioritize RWM interventions based on knowledge and practice, to understand that instead of making blanket recommendations or “on size fits all” approaches, and to investigate what works where and why. Attitudinal and behavioral change need to be made at all levels (governments, NGOs, communities, farmers, extension workers) in order to adopt innovations, and to appropriately target relevant interventions based on land use, potential and opportunities. Based on the identified/recommended interventions, users need to plan, adopt and manage interventions. Next users need to learn, depending on the quality of land, topography and rainfall, where to appropriately cultivate crops or trees and situate the water harvesting structure and master the use of the new technologies.

10.5 Research methods

What research methods will you use to develop the outputs?^{vi}

Output 1:

This involves the identification of potential rain water management technologies and strategies, the locations where these are currently implemented, and characterization of the biophysical and socio-economic conditions in which they can prevail. These activities will be guided by the research conducted under the IWMI led project on Agricultural Water Management (AWM) Landscape Analysis. This project aims to generate knowledge about AWM interventions and how they operate in a particular socio-economic and physical environment and is currently being implemented in the Ethiopian Highlands with a specific focus on the Blue Nile. The methodology developed in the framework of this project is based on a “Rapid Participatory Opportunities and Constraints Analysis (RPOCA)” approach for the collection and collation of data on water management interventions. The key idea underlying this approach is that an AWM intervention would strengthen the livelihoods of poor women and men provided it: [a] broadens their access to productive resources or technologies; [b] it is high on techno-economic viability; and [c] has a strong techno-institutional ‘fit’. Of a variety of such potential interventions which can be identified however, only few may qualify for large-scale out-scaling; and these are those which have: [a] strong favorable forward linkages; [b] strong favorable backward linkages; [c] are examined to be socio-ecologically benign; and [d] have either strong positive externalities, or have negative externalities that can be internalized relatively cost-effectively.

The dataset of AWM interventions collected under the RPOCA framework will be used as a basis for the collection of further case studies in Ethiopia, and, if necessary, the collection of further information on the existing entries. Combined with a

literature review and stakeholder consultations, this dataset will yield a baseline inventory and first-cut characterization of RWM strategies and technologies for the Ethiopian section of the Blue Nile basin, while field experiments, household surveys and key informant interviews will be used to validate these initial findings (Tasks 1.1, 1.2, 1.5). Methods for assessments of crop and livestock water productivity (Task 1.3) developed during CP 37 and 59 (reports currently under preparation) will be evaluated for the study areas and gaps and in the results will be identified. These will be refined and applied to the study area as appropriate. Existing spatial datasets describing the biophysical conditions (e.g. rainfall, topography, soil) of the basin will be identified, and a framework developed to link the RWM strategies and technologies to these (Task 1.4). The production systems and hydronomic zoning work undertaken for CP 59 will be used as a basis for this.

Output 2:

The first task under Output 2 involves a biophysical and socio-economic characterization of the Ethiopian Highlands. Building on the rich source of information coming out of our previous work in the Nile basin, the Ethiopian highlands will be mapped in terms of a variety of biophysical conditions including topography, soil types, farming systems, cultivation area and crop yield (Tasks 2.1, 2.2, 2.3).

The choice of parameters to include in this characterization effort will be informed by the findings of Output 1. Based on this output a list of conditions that influence suitability of RWM interventions will be determined (Task 2.4). This will be followed by an iterative process of eliminating redundant variables, combining variables, or decomposing them into a number of easier-to-measure variables. The resulting spatial proxies for biophysical and socio-economic conditions that favor or constrain the successful implementation of water management interventions will be collated in a GIS database.

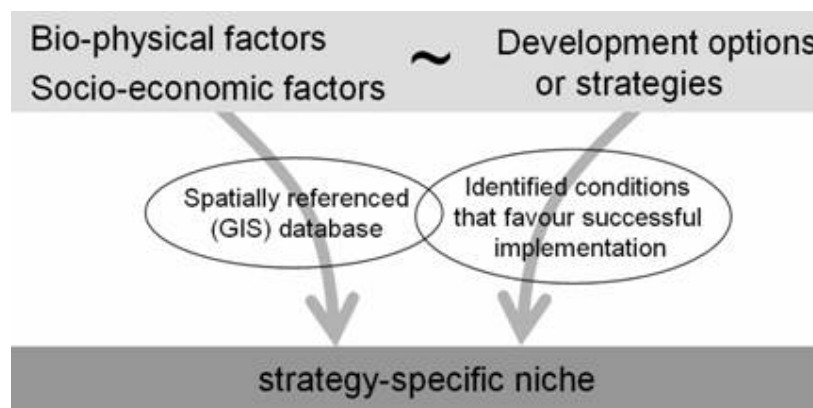
Under CP 37a large amount of bio-physical variables were collected. We will also build on other existing databases (e.g. Soil Conservation Research Programme and ETHIO-GIS developed by CDE), remote sensing data and primary data available from our network of partners.

CP59 is yielding a rich spatial dataset on poverty and vulnerability indicators. In addition, household level data showing the water-poverty linkages has been collected in Uganda. Additional household interviews will be conducted to assess the applicability in the Ethiopian Highlands. In coordination with Project 1, a review of RWM policy at federal, regional, Woreda and community level and a review of micro-credit schemes and extension as well as research extension linkage in rainwater management will be conducted. Finally a review of available partners and service providers for the development of rain water harvesting will be carried out. Methodologies include literature review, stakeholder consultations and key informants interviews.

All the information will be consolidated in a well-structured and documented spatial database in ArcGIS format. A series of GIS maps will be produced on the basis of this database.

Collation and synthesis of appropriate RMS and RWM interventions will be performed based on the datasets produced under Output 1.

Following the framework developed under Task 1.4, we'll use a GIS system and database to spatially match the appropriate RMS and RWM interventions with the actual conditions on the ground (Task 2.5) (see figure below)



Output 3:

Output 3 involves the development of a number of scenarios of intervention combinations and associated land use systems. The high potential interventions will have been identified in Output 1 through a process of stakeholder consultation and a review of the literature and existing datasets (see Output 1 above). Information on land use systems and biophysical conditions will have been developed in Output 2. These two outputs will be combined to develop scenarios for high potential interventions matched to a set of biophysical conditions (Tasks 3.1 and 3.4). Tasks 3.2 and 3.3. entail an assessment of the biophysical and socio-economic impacts of these scenarios. We will look at impacts on hydrology, water flow, water productivity, agricultural productivity, and poverty. Existing hydrological models will be applied building on findings from CP37 relating water-poverty linkages and the application of household models (e.g. Gonzalez-Estrada et al., 2007). Qualitative assessments of equity and gender issues will be included. Parameterization will be done based on household interviews and participatory approaches (e.g. community meetings and discussions with key stakeholders).

Based on the results of the impact assessments high-impact interventions will be identified. This will involve multi-criteria analysis based on the participatory weighing of the importance of different impacts. Maps with the recommendation domains of these high impact interventions with respect to topography, farming system, soils, climate, social and institutional settings will be produced (Task 3.5). This work will also build on the production system, water and livestock productivity, and hydronic zoning maps produce under CP 59 and the work on suitability domains under the AWM Landscape Analysis project.

10.6 Participatory research approaches

What will you do to ensure that the potential users do learn what is necessary to adopt?^{vii}

We suggest applying community level participatory processes, including major principles and lessons for 'socially optimal' decision-making (e.g. problem prioritization, visioning, technological and policy solutions), resulting in changes in system productivity and market access for the poor (in particular women). While doing so, we need to encourage a continuous dialogue leading to action and better engagement of the poor and women in accessing technologies and practices. In addition we will address the challenges faced to achieve pro-poor adoption processes for improved NRM and market access; and improve links between communities, local government, service providers and national policy-makers for improved collective action in NRM and marketing.

It is crucial to increase the institutional and community participation in the scaling out and dissemination of the complex, management intensive RWM technologies (e.g. agro forestry, soil and water conservation) and practices (e.g. collective action, payment for environmental services). A wide range of technologies and practices are available based on previous research by a wide range of partners in the region, including from CPWF Phase I, IWMI, ILRI, CIMMYT, TSBF-CIAT, EIAR, and NGOs. Many of these interventions have to be locally adapted. A provision of principles that help improve local application would be useful. User-friendly ways that improve the integration of techniques in combination with systems analysis can assist farmers who have multiple goals, constraints and circumstances. Through participatory monitoring methods farmers and communities get regular feedback on the impact of changed management, while scientists can learn and contextualize information coming from a wide range of circumstances.

The project will develop at the start of the project a project impact pathway which will link closely to the project impacts pathway of the AWM landscape Analysis project and therefore benefit from interaction with next users planned throughout implementation of that project. Engaging these next users such as policymakers, investors and implementers from the beginning of the project and at key points throughout project implementation will strengthen the project's influence as well as the likelihood and rate at which project recommendations are subsequently adopted and achieve impact.

10.7 Change in user practice

What will users do differently by adopting and using the research outputs?^{viii}

Output 1:

Universities and research centers will be more motivated to undertake problem oriented and high impact research. They will contribute more to solving local problems and produce results that can inform and influence policy. They will have broadened their knowledge and capabilities to interact with policy makers, communities and farmers. Governments and NGOs will have a means to approach communities in ways that make adoption of appropriate RWM technologies more likely to increase productivity, and to improve their livelihood and well being.

Output 2:

Farmers and community level user groups will depend more on informed decisions for improving their livelihood. For policy makers the research output will serve as an adoptable blue print document that can enhance existing rural development policies and strategies. Government strategies for diversification and specialization can be effectively served by the results. Extension and development agencies will use the products to advise farmers effectively and in more understandable ways. NGOs and donors can focus more on appropriate interventions instead of inadequately studied ones, that would not been revealed through local knowledge only.

Output 3:

Governments (local, regional, and federal) and funding agencies will have access to the information necessary to target interventions for a high impact thereby avoid blanket recommendations in their strategies. Government, non government donors and communities will undertake more appropriate planning, design and implementation of RMS interventions. Through knowledge of the best land use systems, farmers and communities will reduce livelihood risks associated with rainfall variability and poor water management through improved practices.

10.8 Suggested sites

Taking into account sites mentioned in the description of the BDC research program, and the need to work together with other projects, where will this project work?

This project is implemented in the Blue Nile section of the Ethiopian highlands. The work will be carried out at three scales:

- i) Sub-basin scale: The mapping and characterization work will be conducted across the whole of the Ethiopian portion of the Blue Nile Basin. This includes evaluation of the basin flows, economic and livelihood gains, communication, scaling up and out, etc it will consider the whole of Ethiopian highland part of the Blue Nile basin. This will be conducted in synergy with Project 4 to allow for exchange of outputs.
- ii) Landscape scale: Extrapolation domains and scenario work will be conducted at the landscape scale, and will feed into Nile BDC Project 2.
- iii) Site level: Specific evaluation of impacts at learning sites. Identification of sites will be synergized with other CPWF projects and as well as existing partner sites for

cost and research effectiveness. Potential sites for example include: ENTRO watershed management intervention sites, specific farming research sites of ARARI ad ORARI, etc.

The selection of sites and scaling issues will be refined in collaboration with other BDC projects and stakeholders at inception.

11. Activities and Implementation Plan

*In the form of a **Gantt chart**, constructed as an Excel spreadsheet, please provide a tabular description of the activities leading to outputs (both research and communication) and uptake that your team will undertake. A Gantt chart is ‘timeline’ that shows the sequence of activities leading to outputs and uptake and constructing it helps ensure that the sequence of activities you propose is feasible. Construct it in monthly segments over the life span of your proposed work. The Gantt Chart does not contribute to the word count. BE AWARE THAT THE GANTT CHART IS INDICATIVE and need not be too detailed because if successful your project implementation plans will be coordinated and finalized during the Inception Workshop*

Send the Gantt chart as a separate document called Annex A – Project Gantt Chart.

NOTE: The Gantt chart is not included in the word count

12. Communications and alignment with CPWF Culture [1000 words]

12.1 Communications

The project is expected to contribute to the following communications products:

- A series of innovatively-designed output products that communicate the findings of the project to a range of stakeholders with a diversity of competencies.
- Peer reviewed journal articles, books and book chapters, particularly in Nile-based journals and edited volumes, that describe what technologies might work best where; the likely impacts of technological adoption on hydrological flows for the basin as a whole; the methodologies applied to identify local institutional development and strengthening, in support of RMS; on the types and combinations of ground and water conservation strategies that need to be applied in order to maximise water productivity and livelihoods resilience; given rainfall variability across the basin, analyses of what land use works best where, in terms of livelihoods and water productivity potential.
- A report series providing guidelines on the likely benefits of these technologies in the Ethiopian Highlands and elsewhere in the basin; support to policy and administration by describing and analysing what rainwater harvesting technologies work best where; the identification of suitable, small-scale and local institutions to manage and maintain these technologies, and how these might be strengthened and/or improved.
- An open access website with contributions from CPWF partners and stakeholders

Briefly describe your communications plan

A detailed communication strategy and impact pathway will be developed at the project inception stage. This will consist of two components, incorporating i) mechanisms for communication within the core implementing team and ii) mechanisms for supporting the effective scaling out, scaling up and adoption of high impact technologies by the relevant target groups.

Strategies for both components will be developed through consultation with implementing partners, key stakeholders, and CPWF. The communication strategies will build on techniques and mechanisms which have proved to be successful in past projects operating within the basin (and in particular projects CP 19 and CP 59), the information and communication networks developed by these. The CPWF community of practice as well as that developed by the Nile Basin Focal Project provide valuable tools for both internal and external project communication and information sharing will be developed, including i) a central document repository, and ii) an open access, interactive website. The latter will include contributions from both CPWF partners and project stakeholders. The project impact pathway will be closely aligned with the impact pathway of the AWM landscape analysis project to benefit from policy dialogues, development of investment briefs and other dissemination opportunities provided by them.

Methodologies developed and key results will be communicated through the usual scientific channels including peer reviewed journal articles, book chapters, and conference proceedings. These will include, for example, descriptions of the appropriate technologies identified, the hydrological impact of the adoption of these at the basin scale, and the methodologies used for identification of local institutional development needs in support of RMS. Policy makers and investors will be targeted through investment briefs and policy briefs.

The project will also build on several innovative research dissemination techniques currently in use in other CGIAR projects, and collated and assessed through the IWMI-led CGIAR Knowledge Sharing in Research project and dissemination materials used successfully in the Basin Focal Projects. These products will effectively communicate the findings of the project to a wide range of stakeholders with a diverse range of competencies.

12.2 Evaluative culture

The CPWF wishes to foster an evaluative culture in its BDCs and component projects. An evaluative culture is one that encourages learning and change by supporting project staff and partners to engage in self-reflection and self-examination, seek evidence and make time to learn. Evidence will likely derive from monitoring and evaluation including gender and diversity analysis. Note that BDC Coordination Project will provide support in this regard, beginning in the Inception Workshop. You may include your expectations for the support you will need here.

Briefly describe how you will support an evaluative culture in the project

Impact pathways and an M&E framework will be developed at the inception phase with assistance from the Nile BDC coordination project, in order to ensure achievement of project results, outcomes and impact. Following a set of criteria identified in consultation with the Nile BDC Coordination Project, key lessons learned at all stages of the project will be evaluated, and appropriate adjustments made accordingly. The coordination project will provide support throughout the project for the implementation of the M&E strategy.

We will work closely with the Nile BDC Coordination Project in order to identify innovative methods for knowledge sharing and facilitation, in an attempt to foster mutual learning among research, development and local institutions in order to enhance the relevance and uptake of rainwater management research. The evaluation model will be based on a process of adaptive learning, putting into practice what has been learned, providing reflection and feedback on what has worked and what has not, followed by further cycles of learning, practice, reflection and feedback.

The project will form an integral part of both ILRI and IWMI's institute-wide project portfolio and will therefore be subject to its Quality Management System, that includes standardized procedures for documenting, reporting, monitoring and reviewing projects. The monitoring of progress in executing project activities will be the responsibility of the Project Leader (PL). The PL will produce six-monthly progress and financial reports in order to consolidate progress in terms of processes, tangible activities and outputs. This will ensure close monitoring of progress and identify the need to change the implementation plans if necessary.

12.3 Alignment with CPWF core values

The CPWF's core values include capacity building, interdisciplinary research, partnership and awareness of gender-and-diversity issues. Highlight how the project will align itself with these values.

Capacity building is a core element of the project. Impact pathway analysis will be conducted during the inception phase to identify capacity building needs related to technology generation, dissemination and uptake of RMS. During project implementation links will be established with universities/colleges within Ethiopia. This will develop further the capacity building efforts undertaken in previous projects, such as CP19, 37 and 59.

In order to meet the project objectives and to successfully identify the biophysical and institutional conditions which affect the suitability of RWM strategies an interdisciplinary approach is essential. The study team is composed of researchers with a wide range of expertise including hydrology, geospatial technologies and socio-economic analyses and participatory research. Our team has the ability to provide unique insights due to the combination of expertise and experience. Through our networks we build from existing experience, yet add different points of view in the water-agriculture-poverty nexus. The multidisciplinary nature of the team will allow us to conduct research which integrates water, livestock, livelihood and poverty issues in a unique and innovative way.

The project team has a history of conducting research in the region, and as such has established strong partnerships with many key institutions and stakeholders. Through CP projects 19, 37 and 59 in particular, networks have been developed in the basin. The project will therefore build on these networks and maintain existing partnerships, in addition to forging new ones where necessary. Key partners will be invited to the inception workshop, with stakeholder participation occurring from the start to ensure buy-in.

This research will promote gender equity as a moral imperative both in the composition of the research team and in reaching the CPWF's poverty reduction and livelihood goals. The methodology which will be used by the project will take gender differentiation and poverty concerns into account. The project will also make use of the spatially referenced database for men and women's farming systems in SSA, which will be developed through the AWM Landscape Analysis project that can be used for further analysis of the likely gender distribution of benefits from water or other agricultural investments. This project will ensure that women are communicated with during all aspects of project implementation and research, thereby ensuring that the research outputs are useful and appropriate for women, so that women will ultimately be able to capture the benefits of RMS and negotiated policy decisions.

13. Assumptions and Risks [600 words]

Explain briefly the assumptions and risks that you made when determining that the projects resources would successfully lead to the project objectives. These would be beyond the scope of the project, yet will influence the uptake that your project can expect. What precautions have you taken in project design to minimize those risks that you can influence?

Project 3 requires input from other Nile BDC projects, while the outputs subsequently feed back into these projects. Strong coordination of the various Nile BDC projects is required in order to ensure successful exchange and harmonization of data inputs and outputs, in order to meet the milestones identified (see Annex A). Information from Project 1 (learning from the past) feeds into the proposed work, as do outputs from additional external projects (e.g. IWMI's AWM Landscape Analysis Project). We assume the results will be available in good time and we will be able to incorporate them into our proposed analysis.

A growing number of stakeholders are engaged in the development and implementation of RWM approaches. We assume that our local partner organizations maintain good links with a variety of stakeholders, covering the whole spectrum of influential issues (different farming systems, institutions, policies, etc.) and actors.

The 2 year time frame of the project is quite short. We assume that the previous and on-going work in the Ethiopian highlands has built a sufficiently strong foundation not only in terms of RWM technologies, strategies identified and knowledge generated, but also in terms of partnerships and capacity built. This will provide a sound base for the project, allowing us to complement and further develop work already undertaken and thereby to achieve the project objectives and identified outputs in a relatively short time period.

This project requires the input from a large number of people with very different backgrounds and professional disciplines. Many barriers constrain inter-disciplinary R&D. The project team, however, has been selected to consist of people who have experience working across disciplines, cultures and at multiple scales. In addition many of the team members have worked together successfully in the past, in particular on CP projects 19, 37 and 59. We hope that this will ensure a successful collaboration and achievement of the project objectives.

14. Any other comments to explain your project?

Have you used up your 6000 word limit? If not (or you may want to go back and edit your text), this is your last opportunity to convince the review panel that your project should be supported.

___ **END OF TEXT SECTION: maximum 6000 words in total. Please note that any words beyond 6000 will be deleted and not sent to the review panel.**

14. Project Team^{ix}

Please fill in the table below to describe the project team members. Indicate in particular who has responsibility for communications, M&E, knowledge sharing and gender analysis. These will be people who will normally be funded at least partly by the project. You will be requested to enter into a Memorandum of Understanding with them if successful. Attach a full c.v. for the project leader and a one page c.v. of all team members as Annex B. In order to better understand the experience of the Project Leader you are requested to provide up to three examples of complementary experience in the last ten years in the format provided, and attach as Annex C.

The commitments column is to provide details (time and role) of personnel to other projects during the life time of the CPWF project for which you are tendering. Include any Phase I future CPWF projects that the personnel may be involved in.

Names of team members	Professional discipline	Institutional affiliation and address	Area of expertise important to this project.	Brief description of research responsibilities with respect to the outputs and activities listed in the Gantt chart.	Commitments
Mario Herrero	Systems Analyst	ILRI	Impact assessment, HH modeling, system analysis	Overall coordination and technical back-stopping	<p>Leader of the “livestock futures” unit in ILRI</p> <p>EACLIPSE: adaptation to climate change in the savannah systems of East-Africa</p> <p>GLOBIO: inclusion of livestock in global land use model</p>
An Notenbaert	Geo-Spatial Analyst	ILRI	GIS, spatial analysis, farming systems	Technical backstopping of all GIS work; Output 2.3, 2.5 & 3.4	Vulnerability and adaptation to climate change in the agro-

					pastoral areas of SSA
James Kinyangi	Environmental Scientist	ILRI	Water-poverty linkages	Coordination of the field actions; Outputs 2.1, 2.4, 2.6, 3.3, 3.5	N/A
Jeannette Van de Steeg	Environmental Scientist	ILRI	Modeling crop-livestock systems, land use modeling, land evaluation methodologies	Output 3.1, 3.2, 3.4	NRM and Biodiversity Conservation in the Drylands of Eastern and Central Africa
Nancy Johnson	Economist	ILRI	Livelihood analysis, impact assessment	Output 3.3	Leading the impact assessment unit in ILRI CPWF2-Nile coordination project
Tom Ouna	GIS technician	ILRI	GIS	Outputs 2.1, 2.2, 2.3	
Lisa-Maria Rebelo	Geospatial Analyst	IWMI	Land cover and land use mapping and modeling	Outputs 1.4, 3.1, 3.2	Agricultural Water Management Landscape Analysis: CPWF Nile Project 4
Fitzsum Hagos	Economist	IWMI		Output 1.2, 3.1, 3.3	Agricultural Water Management Landscape Analysis:
Post Doc		IWMI	To be hired	Output 1.1, 1.2, 1.3, 1.5, 1.6, 2.4	
Aster Deneke	Database and GIS technician	IWMI	Database creation and management	Provide support for Output 1 and 3	
Birru	Agronomist	ARARI/ORARI	Soil and water		

Woldetsadik			management, sustainable land management		
Girma Gode	Agronomist	ERWHA	Natural resource management, humanitarian assistance, rainwater harvesting technology		

Provide a brief text statement on why the lead institution is well-placed to lead the group.

The International Livestock Research Institute (ILRI) will lead this project, in strong partnership with International Water Management Institute (IWMI).

ILRI, the CGIAR centre with a comprehensive livestock research mandate, maintains a campus in Ethiopia and has an extensive network of partners working in the country. Over 30 years, it acquired extensive knowledge, data, and experience on livestock the Nile Basin. ILRI works at the crossroads of livestock, environment and poverty. The over-arching challenges that ILRI is pursuing in its MTP are: i) Sustainable Intensification of smallholder mixed crop-livestock systems – increasing productivity through better use of limited natural resources; and ii) Reducing Vulnerability of livestock-dependent households in marginal systems subject to biophysical and socio-economic shocks. ILRI partners strategically with others to generate and synthesize knowledge and approaches that can help poor people cope with economic and environmental vulnerability and take advantage of growing livestock opportunities. ILRI has been leading or strongly contributing to various CPWF Phase I projects, including Livestock-Water Productivity (CP 37), The Upstream-Downstream project (CP 19), and the Nile basin focal project (CP 59). The Livestock-Water project was successful in alerting the R&D community on the positive and negative interactions of livestock and the environment, beyond Ethiopia. Moreover, the IPMS (Improving Productivity and Market Success of Ethiopian Farmers), a major collaborative initiative between ILRI and the Ethiopian Government has been operating in the area. IPMS, with a 20 million Canadian Dollars grant, has been engaged in improving system productivity through facilitating market linkages, capacity building and up-scaling of good practices. The recent CCER of ILRI highlights the importance of rain fed crop-livestock systems for poverty alleviation and NRM and the key role ILRI should play in the coming years.

The International Water Management Institute (IWMI) has been a lead actor and a major player in agricultural water management in the Nile Basin, with the objective of improving water and land management for food, livelihoods and nature and with the goal of contributing to the vision of 'A Food Secure World for All'. IWMI's research is organized around four themes: Water Availability and Access; Productive Water Use; Water Quality, Health and Environment; and Water and Society. IWMI has developed and implemented/implementing over 12 projects in the basin pertinent to its thematic priorities. Through its Nile basin office based in Addis Ababa, it addresses this challenge through an integrated program, of which Land, Water and Livelihoods theme is in key partnership with ILRI. By creating strong partnerships with a large number of strategic partners, IWMI and ILRI have implemented successful projects such as the Comprehensive Assessment of Water in Agriculture, as well as CPWF phase 1 projects such as CP19, CP37 and CP59.

ILRI and IWMI share similar visions to poverty alleviation through empowerment and the use of local partnerships as primary goals and the means to accomplish it. More over, ILRI and IWMI have the following particular advantages to jointly lead the Nile Basin development challenges together:

1. ILRI-Addis Ababa is hosting IWMI's second research hub after Colombo, where four other CG centres are also hosted. ILRI has the facility and the manpower to coordinate big programs like the Nile BDC in the region
2. ILRI has historical linkage with Ethiopian institutions for the last 25 or so years (and IWMI for the last 7 years), including managing collaborative projects, organization of national and international events, training of Ethiopian professionals, and the provision of laboratory facilities
3. IWMI has established effective networks and partnerships to implement its projects in the Nile Basin and Ethiopia
4. Extensive research engagement of ILRI and IWMI in the crop-livestock systems in the Ethiopian highlands, including big initiatives like IPMS, the Vertisol Project, various livestock-water and land management projects
5. Both centers identified water-land-livestock-livelihoods as important themes in their MTPs: ILRI through its People, Livestock, Environment theme and IWMI through its Land, Water and Livelihoods theme, both addressing these a single, integrated agricultural issues
6. There is increasing interest in both centres in integrated research of the bigger whole using water as a key entry point
7. Both centres recognize the importance of understanding innovation processes, and of monitoring and learning as important tools to deliver outcomes

8. The centres possess strong skills in innovations systems research, implementing impact pathways and distilling and promoting lessons learnt.

Provide brief text statements on why the proposed institutions are qualified to carry out the proposed research.

The Amhara and Oromia Regional Agricultural Research Institutes (ARARI and ORARI respectively)

ARARI and ORARI serve the two biggest regions in the Ethiopian Highlands portion of the Blue Nile. These RARIs are responsible for developing technologies and practices relevant to local use, and in facilitating the extension services needed to upscale interventions to wider communities across their respective regions. They are also key players in creating local partnership and influencing policy in RWM.

Ethiopian Rain Water Harvesting Association (EWRHA)

EWRHA has established a network of professionals, civil societies and end users focused around water harvesting practices and technologies in Ethiopia. Their network provides ample opportunity to create partnership for communicating results, to help validate findings, to assist in targeting and out scaling results.

Etc:

16. Bibliography

Please list references and key documents

- Denekew, A., and Awulachew, S.B., 2009. Characterization and Atlas of the Blue Nile Basin and its Sub Basins, printed on CD ROM. International Water Management Institute.
- Gonzalez-Estrada, E., Karanja, S. and Herrero, M. (2007). Application of a household-level model and a ruminant simulation model to assess the role of maize as food-feed crop in the Embu district of Kenya. Technical Report for the BMZ-funded Project: "Improving the value of maize as livestock feed to enhance the livelihoods of maize-livestock farmers in East Africa". ILRI. Nairobi, Kenya.
- Kristjanson, P., Okike, I., Singh, B., Thornton, P., Manyong, V., Kruska, R., and G., Hoogenboom, 2002, Genetically Improved Dual-Purpose Cowpea: Assessment, of Adoption and Impact in the Dry Savannah Region of West Africa, Nairobi, Kenya: ILRI Impact Assessment Series No. 9.
- Molden, D., Oweis, T. Y., Steduto, P., Kijne, J. W., Hanjara, M. A., and Bindraban, P. S. 2007. Pathways for increasing agricultural water productivity. In: 'Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture'. (Ed. D. Molden.) pp. 279–310. (Earthscan: London, and International Water Management Institute: Colombo.)
- Moti, J., Gebremedhin, B., Hoekstra, D. 2009. Smallholder commercialization: Process, determinants and impact. Discussion paper no. 18
- Peden, D., Radesse, G., Hailelassie, A., 2009. Livestock water productivity: implications for sub-Saharan Africa. The Rangeland Journal, 31, 187-193
- Thornton, P.K., Jones, P.G., Owiyo, T., Kruska, R.L., Herrero, M., Kristjanson, P., Notenbaert, A., Bekele, N. and Omolo, A., with contributions from Orindi, V., Ochieng, A., Otiende, B., Bhadwal, S., Anantram, K., Nair, S., Kumar, V. and Kelkar, U. 2006. Mapping climate vulnerability and poverty in Africa. Report to the Department for International Development, ILRI, Nairobi, Kenya, May 2006, 200 pp.
- Van Breugel, P., M. Herrero, J.A. van de Steeg, D. Peden. Livestock and Water in the Nile Basin. Ecosystems. Revised version submitted in July 2009.

FINANCIAL GUIDELINES

Please complete and submit the budget spreadsheet as Annex D to this submission.

Annexes to your proposal submission:

- A: Gantt Chart
- B: Team member c.v.'s.
- C: Project Leader Experience
- D: Budget

Attachments to these guidelines: (you may wish to share these with your legal/financial department)

- 1: Draft Letter of Agreement.
- 2: CPWF Standard Clauses and Procedures.

ⁱ This project is one of several that together constitute a research program to tackle the basin development challenge (BDC). Please read the description of the BDC that can be found in the Medium Term plan. If you are successful you will be expected to work as part of a coherent research program, led by the Basin Leader responsible for program coordination and coherence.

ⁱⁱ Project linkages and project contribution are shown in the BDC impact logic model in the Medium Term Plan

ⁱⁱⁱ List your research proposed research partners here. Specify if you will work with different partners on to develop different products.

^{iv} List here only the next users of the research outputs, that is, the people who will directly use them. This could be fellow researchers, policy makers, extension workers or farmers. For example the next user of a policy recommendation is a policy maker, not a farmer. The farmer, who the policy change benefits, is the final user. Specify if different next users will use different outputs.

^v You might find it useful to think in terms of the changes in knowledge, attitudes and skills (KAS) required for the next users to use the research outputs. Specify if different outputs require different KAS for their successful use.

^{vi} Describe your methodology giving sufficient detail to be understood. Provide relevant references (max. 10). Specify if different outputs require different methodologies. Cross reference to the section on research questions. **This is an important section.**

^{vii} Describe the way you will carry out the research, and the capacity building and outreach approaches you will use, to ensure that targeted next users learn what they need to know so as to adopt and use the research outputs. Specify if different outputs have different requirements.

^{viii} Describe the behavior change(s) in next users resulting from use of the outputs. Specify if different behavior changes are expected through the use of different research products. Examples of behavior changes include farmers adopting a new seed variety or a policy maker changing a policy.

^{ix} The quality and experience of your project team will help ensure the delivery of quality outputs.