UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL

(UCI)

FINAL GRADUATION PROJECT NAME

PROJECT MANAGEMENT PLAN FOR PRODUCTION AND DISTRIBUTION OF ECO IMPROVED COOKSTOVES PROJECT FOR COMMUNITIES IN THE LAKE VICTORIA BASIN, UGANDA

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DEDICATION

I dedicate this project to my dear wife Phionah and my children Arianna, Alvin and Alpha who are my pillars, my source of inspiration and compassion. Thank you for your patience, encouragement, unconditional love, sacrifice and strong belief in my ability.

ACKNOWLEDGMENTS

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ABBREVIATIONS AND ACRONYMS

BfW	Bread for the World
CDM	Clean Development Mechanism
ECO	Ecological Christian Organisation
ERPA	Emission Reduction Purchase Agreement
FGP	Final Graduation Project
ICS	Improved Cook Stoves
ICSEA	Improved Cook Stoves for East Africa
KPIs	Key Performance Indicators
LSC	Local Stakeholder Consultation
MPM	Masters in Project Management
CSOs	Civil Society Organizations
CBOs	Community Based Organisations
PoA	Programme of Activities
UN	United Nations
PMBOK	Project Management Book of Knowledge
PMI	Project Management Institute
PMP	Project Management Plan
SDGs	Sustainable Development Goals
TCS	Traditional Cook Stoves
WBS	Work Breakdown Structure

EXECUTIVE SUMMARY

Ecological Christian Organization (ECO) is an indigenous, Non-Governmental Organization registered with the Uganda's NGO Board under the Ministry of Internal Affairs. ECO works towards the realization of sustained livelihoods and rights of marginalized, under-served and vulnerable groups in Uganda. Since its establishment in April 2005, ECO has implemented a varied portfolio of projects in the greater Karamoja region and the Lake Victoria basin focusing on natural resource governance, climate change and Resilience, and ecosystem management and restoration. However, ECO has no customized Project Management Office (PMO) and the current project management approach in use is not sufficient to successfully deliver a production improved cookstoves project of the magnitude desired. ECO's previous projects have been characterized and affected by unplanned changes in scope, time, cost and human resources which often result in low or negative returns on investment and value for money as well as unpredictable outcomes. Due to the size and complexity of the proposed project, it is of great importance to produce an extensive project management plan. In order to increase the successful implementation of ECO's Improved Cookstoves project (ICS), a Project Management Plan for the production and distribution of ECO Improved Cookstoves Project was developed detailing the management of all critical aspects of the project. Each step was coordinated strategically to develop all of the subsidiary documents which will be used as a guide during project execution. The project explored the Project Management Institute's (PMI) guide to effectively create a Project Management Plan, providing justification for the decisions made while developing the project's integration, scope, time, cost, quality, human resources, communication, risk, procurement, and stakeholder management plans. Each element of the Project Management Plan was created, along with all of the tools, techniques, and concepts used to justify each management decision selected for application in order to guide proper executing, monitoring, and controlling of the project phases as well as completing and managing the work required to meet the project objectives.

The Final Graduation Project general objective was to develop a Project Management Plan for the production and distribution of ECO Improved Cookstoves

Project that meets the standards of the Project Management Institute for communities in the Lake Victoria Basin, Uganda. The specific objectives were: (objective 1) To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan; (objective 2) to create a scope management plan to ensures that all works required are included to successfully complete the project; (objective 3) to create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints; (objective 4) to create a cost management plan to define the processes for developing and managing the project budget that ensures the project is completed within the budget constraints; (objective 5) to develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints; (objective 6) to create a human resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints; (objective 7) to develop a communication management plan to ensure the timely and effective communication of the project status and other key information; (objective 8) to create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks; (objective 9) to develop a procurement management plan to be used to obtain products, services or results required by the project and; (objective 10) to develop a stakeholder management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution

The methodology used was analytical, where the information came from sources such as A Guide to the Project Management Body of Knowledge (PMBOK® Guide) 6th Edition and interviews with different key stakeholders or content experts. All the information was gathered towards the creation of all the subsidiary documents that integrates the Project Management Plan for the ECO Improved cookstoves project. The Project Management Plan developed provided a new methodology for the project team to build a more thorough project management plan for a project as

important as the ECO Improved cookstoves project, to improve the way ECO would manage the project.

It is recommended that ECO improved cookstoves project must use the formal and documented processes for project management to minimize the risk of missing critical items for projects completion. Create document management and storage system as a repository share drive to store all the projects developed for the organization in order to have more accessibility to historical information, previous learnings and future use. ECO should create and develop a project management team, complete quantitative risk analyses for all projects like ICS, pursue the implementation of project management culture, hire a project management team and assure it's in place prior to the execution of any project and consider the use of the planning process and templates created during the development of the Project Management Plan for the ECO ICS project, as a basis for implementing a methodology to be used by ECO for future projects of similar relevance.

1   INTRODUCTION

1.1   Background

The Ecological Christian Organization (ECO) is an indigenous, Non-Government Organization (NGO) registered in Uganda and working towards the realization of sustained livelihoods for marginalized, under-served and vulnerable groups in Uganda. Since its inception in 2005, ECO has implemented a varied portfolio of programmes in the greater Karamoja region, the Abertine rift and the Lake Victoria basin. The current initiatives are focusing on natural resource governance, climate change and livelihoods, and also ecosystem management and restoration. ECO's mandate spans the entire country, which, despite its abundant and quality natural resources, has a high proportion of food-insecure people living below the poverty line and contributing significantly to environmental degradation. There are, however, considerable opportunities and possibilities for economic growth and the attainment of national and global sustainable development goals, particularly those relating to poverty, hunger and environmental sustainability. ECO is a member of International Union for Conservation of Nature (IUCN), Participatory Ecological Land Use Management (PELUM-Uganda), Climate Action Network – Uganda (CAN-U), Publish What You Pay – Uganda (PWYP-U), Civil Society Coalition on Oil (CSCO), Uganda Water and Sanitation NGO's Network (UWASNET), Uganda Coalition for Sustainable Development (UCSD) and Riamriam Civil Society Network in Karamoja, among others. Since its establishment in April 2005, ECO has implemented a varied portfolio of projects in the greater Karamoja region and the Lake Victoria basin. ECO has 23 qualified staff on contract both in finance and programme with 6 offices and has operational presence in 10 districts across Uganda.

ECO therefore plans to produce improved cook stoves as a cleaner and more efficient cooking method for the households in its programmes, who are primarily using traditional cooking methods. ECO's improved cookstoves project is focused on production, distribution and installation of efficient cook stoves to replace inefficient Traditional Cook Stoves (TCS) in rural communities around Lake Victoria Basin. The project will install efficient cook stoves in 14,000 households which will generate 192,024 carbon credits in nine years. This will result in significant savings of

unsustainably harvested firewood, thereby reducing greenhouse gas emissions from thermal energy consumption. ECO's Improved Cook Stove Project will promote a healthier lifestyle for its beneficiaries and will influence the wider community to adopt better cooking practices. The intended impacts of the project include reductions in health risks associated with indoor air quality in poor and low-income households in targeted areas, time and cost savings in household fuel use, and reductions in greenhouse gas emissions. The intended result is to scale up the proper use and adoption of clean cookstoves in poor and low-income households in rural Uganda through sustainable, market-based solutions. The project contributes at several levels to a more sustainable development in the targeted areas. The project reduces the pressure on forest land through reduced fuel wood need. This includes also that beneficiaries of the new technology will bear less cost from buying/searching fuel wood. Further, through more efficient fuel wood burning process less smoke is produced and air quality in the kitchen is ameliorated. Additionally, stoves have a lower risk of fire accident compared to the three-stone cooking as baseline scenario.

1.2   Statement of the problem

Since its establishment in April 2005, ECO has implemented a varied portfolio of projects in the greater Karamoja region and the Lake Victoria basin focusing on natural resource governance, climate change and Resilience, and ecosystem management and restoration. However, ECO has no customized Project Management Office (PMO) and the current project management approach in use is not sufficient to successfully deliver a production improved cookstoves project of this magnitude. ECO's previous projects have been characterized and affected by unplanned changes in scope, time, cost and human resources which often result in low or negative returns on investment and value for money as well as unpredictable outcomes. Due to the size and complexity of the proposed project, it is of great importance to produce an extensive project management plan. Each element of the Project Management Plan will be created, along with all of the tools, techniques, and concepts used to justify each management decision selected for application. This will guide proper executing, monitoring, and controlling of the project phases as well as completing and managing the work required to meet the project

objectives. Unlike in other ECO projects, ECO's improved cookstoves project will follow the Project Management Plan created as a result of this project and it is expected that the level of project success will improve significantly. The KPIs include: 15,000 people use ECO ICS that meet the *Clean Development Mechanism (*CDM)'s 20% minimum thermal efficiency requirements over the period of 4 years. On average, each family reduces around 2.5ton CO2/year and saves around 40% in fuel. 192,024 carbon credits generated leading go increase household income. Along with emission reductions (SDG 13), the business will contribute to other Sustainable Development Goals (SDGs) in the following ways: To reduce the money spent on purchasing firewood (SDG 1); To reduce the money spent on replacement and maintenance of ICS (SDG 7); To reduce respiratory illness caused by indoor air-pollution (SDG 3); To decrease unsustainable deforestation and environmental degradation (SDG 15) and help mitigate climate change and contribute positively to SDG 13, by stabilizing forests, increasing biodiversity, enhancing soil fertility and water retention, as well as preventing soil erosion (SDG 15). This project must be completed in time in order to provide the required support and benefit to the user households. There is need to avoid any lack of planning within the activities and the scope of the project. The project needs to meet certain requirements and to undergo several tests within a really tight time schedule and involves many stakeholders. This Project Management Plan should be able to provide all the subsidiary documents of the project in order to avoid any lack of planning within the activities and the scope. If completed successfully and the lessons learnt will be replicated into other projects and the entire approach and processes institutionalized in the entire organization.

1.3   Purpose

In order to increase the successful implementation of ECO's improved cookstoves project, a Project Management Plan for the production and distribution of ECO Improved Cookstoves Project will be developed detailing the management of all critical aspects of the project. Each step is to be coordinated strategically to develop all of the subsidiary documents which will be used as a guide during project execution. The project will explore the Project Management Institute's (PMI) guide to effectively create

a Project Management Plan, providing justification for the decisions made while developing the project's integration, scope, time, cost, quality, human resources, communication, risk, procurement, and stakeholder management plans.

1.4   General objective

To develop a Project Management Plan for the production and distribution of ECO Improved Cookstoves Project that meets the standards of the Project Management Institute for communities in the Lake Victoria Basin, Uganda.

1.5   Specific objectives

1. To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan.
2. To create a scope management plan to ensures that all works required are included to successfully complete the project.
3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints.
4. To create a cost management plan to define the processes for developing and managing the project budget that ensures the project is completed within the budget constraints.
5. To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.
6. To create a resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints.
7. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.
8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.

9. To develop a procurement management plan to be used to obtain products, services or results required by the project.

10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.

2   THEORETICAL FRAMEWORK

2.1   Company/Enterprise framework

2.1.1 Company/Enterprise background

Ecological Christian Organization (ECO) is an indigenous, Non-Governmental Organization registered with the Uganda's NGO Board under the Ministry of Internal Affairs. ECO's NGO Board registration number is S.5914/5509. ECO works towards the realization of sustained livelihoods and rights of marginalized, under-served and vulnerable groups in Uganda.   Since its establishment in April 2005, ECO has implemented a varied portfolio of projects in the greater Karamoja region, the Abertine rift and the Lake Victoria basin. ECO's current initiatives and programs are focused on natural resource governance, climate change and livelihoods, and ecosystem management and restoration. ECO has operational presence in the districts of Moroto, Abim and Nakapiripirit (Karamoja); Bugiri, Buikwe, Mayuge, Wakiso, and Rakai (Lake Victoria basin); and Masindi (Albertine Rift). ECO is currently getting its funding support from DGF, Cordaid, Bread for the World, Pathfinder Uganda, Oxfam Uganda, Infos Sustainable Energy, OSIEA, Fauna and Flora and Norah Stuart (individual donor).

According to (www.ecouganda.org 2019), ECO has recorded several achievements from its 15-year work in Uganda. It has demonstrated notable achievements related to the focus of this strategic plan, in order to pave a way for scale up of tested approaches in addressing development challenges in Uganda. The following achievements have been found to be outstanding;

1. Contribution to national policy formulation and review: The unique interventions in Karamoja sub region, the Lake Victoria basin and the Albertine Rift informed decision making processes including the formulation of Uganda's National Climate Change Policy, National Climate Change Mainstreaming Guidelines, the Mining policy framework, updating NAPA prescribed interventions to inform its wide national application, informing national and regional positions for climate change adaptation under the East African cooperation and the international negotiations under the United Nations Framework Convention on Climate Change.

2. Ecosystem management and restoration: Our program on "Health of People and the Environment in the Lake Victoria Basin (HoPE-LVB)" contributed to protection of Lake Victoria, the world's second largest freshwater lake by surface area and a source of livelihood for over 7 million people in Uganda. The program employed an integrated approach combining population, health and environment (PHE) in tackling ecosystem management and restoration. Our efforts have been globally recognized, and this initiative was selected as Winner of the Population Institute 35th annual Global Media Awards for Best Film "HoPE IN THE BASIN".

3. Research and dissemination: ECO has undertaken research on different topical issues such as the extractive sector governance, climate change adaptation and resilience, conservation of fragile ecosystems, rights of indigenous communities, among others. The different research and project baseline reports have attracted the academia, policy makers, planners, decision makers, local leaders, the private sector and local communities. ECO has also received both local and international visitors interested in learning from its development approaches and best practices in the above-mentioned areas. ECO has demonstrated and highlighted innovative and realistic policy options/alternatives towards the desired change.

4. Knowledge development, sharing and learning is an evolving culture at ECO. Linkages with 5 knowledge & resource organizations i.e. Uganda's Climate Change Department, Uganda Meteorological Authority, Department of Veterinary Medicine (Makerere University, Climate Action Network-Uganda (CAN-U), Publish What You Pay – Uganda (PWYP-U), Civil Society Coalition on Oil & Gas (CSCO), PELUM Uganda and NACSOF-Nakapiripirit have been established.

Whereas there is objective evidence that ECO's interventions in the last 10 years have contributed to improving the livelihoods and resilience of communities in the focus areas, as well as shaping policy development processes in Uganda, we realize that significant sustainable development will not be accomplished without addressing the

underlying causes and constraints that maintain the respective people in chronic poverty, which is an undisputable form of social injustice.

2.1.2 Mission and vision statements

ECO's mandate spans the entire country which, despite its abundant and quality natural resources, has a high proportion of people living below the poverty line and contributing significantly to environmental degradation. There are, however, considerable opportunities and possibilities for economic growth and attainment of national development goals and global sustainable development goals, particularly those relating to poverty, hunger and environmental sustainability. Thus, ECO envisions an improved quality of life and sustainable livelihoods for the undeserved and vulnerable groups in Uganda, through improved and sustainably-managed natural resources. ECO's mission is to engage and empower under-served communities and vulnerable groups to realise and protect their rights and dignity in a context of sustained ecosystems and inclusive governance.

2.1.3 Core values and principles

To effectively respond to the current and emerging challenges in the country, ECO will implement its strategy by embracing the following core values:

Ecological Wisdom: We acknowledge; i) that human beings are part of the natural world and we respect the specific values of all forms of life, including non-human species; ii) the wisdom of the indigenous peoples of the world, as custodians of the land and its resources; and iii) that human society depends on the ecological resources of the planet, and must ensure the integrity of ecosystems and preserve biodiversity and the resilience of life supporting systems. This requires that we learn to live within the ecological and resource limits of the planet, as well as protect animal and plant life.

Social Justice: We assert that the key to social justice is the equitable distribution of social and natural resources, both locally and globally, to meet basic human needs unconditionally, and to ensure that all citizens have full opportunities for personal and

social development. We declare that there is no social justice without environmental justice, and no environmental justice without social justice.

<u>Integrated and holistic approach:</u> Integration and team work across levels, disciplines, gender, timeframes and space, is critical for effective and efficient management of natural resources because of the complex inter-linkages of the different components of ecosystems and their management.

<u>Empowerment of end-users:</u> Artisanal miners, smallholder farmers, agro-pastoralists, pastoralists and fisher folks, with their unique traditional norms and socio-culturally-respected values, are the prime custodians and managers of key land and other natural resources. It is their decisions and actions which shape and make the most significant and demand-driven differences. Therefore, their inclusion and active participation in the governance arrangements, technology development and knowledge sharing for the management of ecosystem and ecosystem services will be a key focus in implementing this strategy.

<u>Impact orientation:</u> Social justice, transparency and accountability, poverty reduction, improved food security, improved access to public social services and safeguarding environmental quality, taking account of equity issues, are core to this strategy. These will be pursued through integrated approaches, that not only tackle the challenge, but the root causes as well.

2.1.4 Organizational Structure
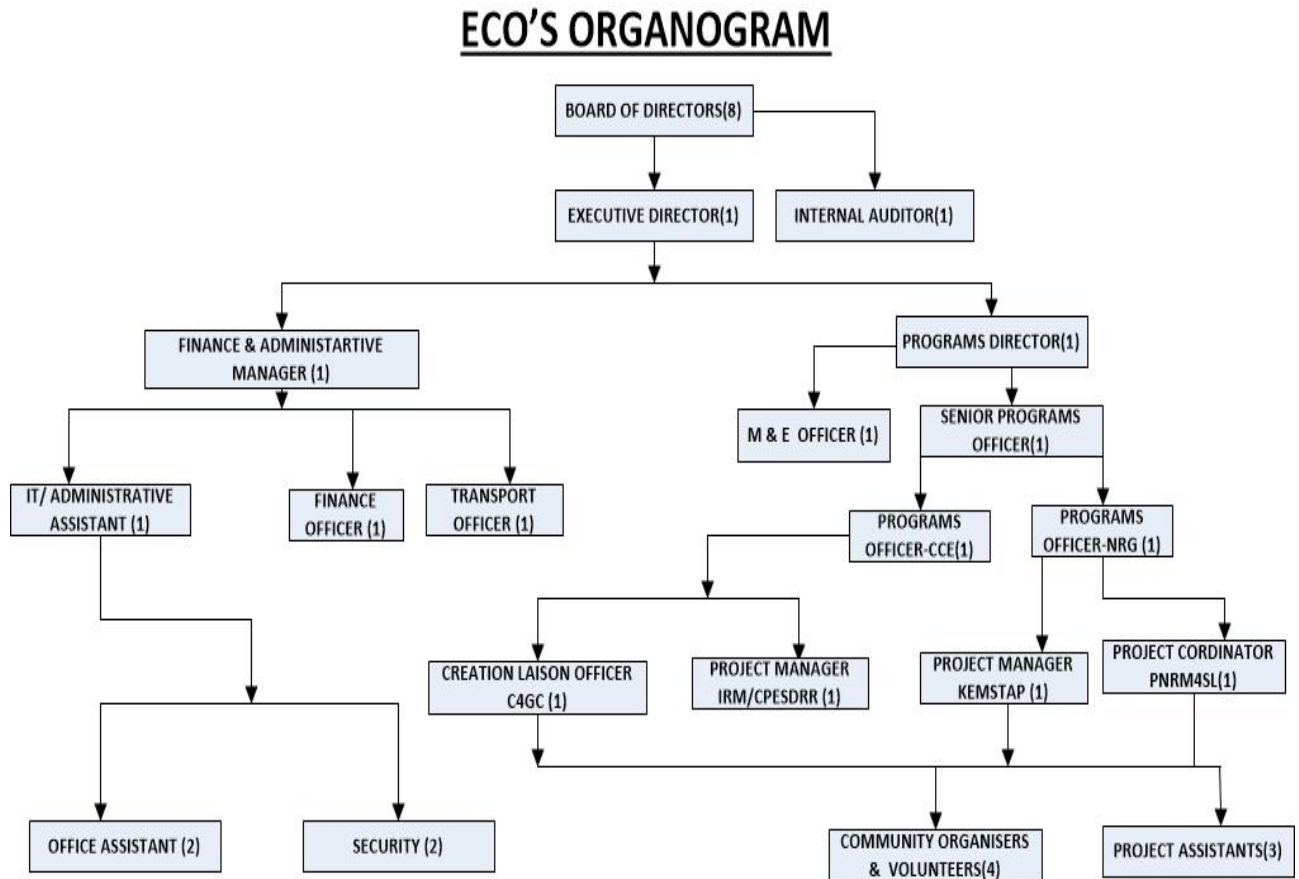
Figure 1: Organizational structure (Source: ECO Strategic Plan 2016-2021)

2.1.5 Products offered

ECO's effort focuses on achieving change in four key areas (referred to as strategic propositions for change), as shown in figure 2. It should be noted that the proposed focus areas enhance each other and as such will not be implemented in isolation.

Table 1: ECO's strategic areas (Source: ECO Strategic Plan 2016-2021)

#	Strategic proposition for change	Objective
1	Natural Resources Governance	To promote transparent, accountable, sustainable and equitable management of land and extractive mineral resources for human development.
2	Resilience and Climate Change Adaptation	To build community resilience, through increasing adaptive capacity to climate change and other natural hazards.
3	Ecosystem Management and Restoration (EMR)	To enhance biodiversity conservation and sustainable resource use in Uganda's fragile, semi-arid and aquatic ecosystems.
4	Institutional Strengthening	Establish a financially sound and sustainable organization with a growing base of financial support, accountable institutional systems and dedicated support for priority programs, high quality outputs and learning.

2.2   Project Management concepts

2.2.1 Project

The PMBOK® Guide has defined a project as "A temporary endeavor undertaken to create a unique product, service, or result" (Project Management Institute, 2017, p.6). It's a temporary endeavor undertaken to create a unique product, service or result. A project is temporary in that it has a defined beginning and end in time, and therefore defined scope and resources. And a project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal.

2.2.2 Project management

According to the PMBOK® Guide Project Management is the "application of knowledge, skills, tools, and techniques to project activities to meet the project requirements", and realized through meticulous application and incorporation of "47 logically grouped project management processes, which are categorized into five Process Groups." (Project Management Institute, 2013, p, 5).

Project Management Methodology especially as espoused by the Project Management Institute (PMI) and the Guide to the Project Management Body of Knowledge (PMBOK®

Guide) certainly serves as an indispensable reference. This Methodology focuses on the Processes that a project goes through namely initiation, planning, executing, monitoring and controlling, and closing. All projects from the least to the most complex can be broken down into smaller more manageable work packages which, when initiated and implemented can be easily monitored and controlled to obtained the desired results within the constraints of Scope, Quality, Schedule, Budget, Resources, and Risks. With this in mind, building and in particular the one mentioned in this document may be constructed within the "triple constraints" of time, cost and quality.

2.2.3 Project life cycle

According to the Project Management Body of Knowledge, the foundation of project management rests upon the five phases that every project goes through:

Figure 2: Five Phases of Project Life Cycle (Source: C.Kabiswa, Author, 2019)

a) **Initiating.** The tasks required to authorize, fund and define the project, generally on the organizational level (*above* the project). The organization defines a business need and commissions the project to meet it.

b) **Planning.** The project management team define how the project will be carried out, who will do the work, how long it will take, and so forth. The planning phase defines the project in sufficient detail that all stakeholders' expectations are understood.

c) **Execution.** The project work is completed and the end product or service is achieved while secondary stakeholder requirements are satisfied.

d) **Monitoring & Controlling.** Concurrent to the project work (execution phase) the project management team monitors and controls all aspects of the project –

schedule, cost, stakeholder's requirements, etc. If problems are encountered, changes to the project plan are made.

e) **Closing.** The project has completed its product or service, and the necessary documentation and administrative work must be done to close the project.

In each phase, one or more project management documents are created (Table 2). The planning group is by far the largest within the PMBOK, and is the most intensive for the project manager, although the execution phase is the most intensive for the project team. It contains more than half of the processes even though it is only one out of five process groups. The project management plan that is generated during the planning phase encompasses all of the knowledge areas, and it should be scaled to the size of the project.

Table 2: Project management documents at different Phases

Phase	Project Documents
Initiating	▪ Project Charter
Planning	▪ Project Management Plan
Execution	▪ Status Updates ▪ Stakeholder Communications
Monitoring	▪ Earned Value analysis ▪ Project change documentation
Closing	▪ Final reporting

Source: C. Kabiswa, Author, 2019

2.2.4 Project management processes

The project management processes as defined by PMI® PMBOK® 6 consists of Initiating, Planning, Executing, Monitoring and Controlling and Closing. Every project is a temporary endeavor and will need to be executed well based on the proper planning to avoid unnecessary overruns and schedule deviations. Managing projects is no wonder a challenge that entails conceiving a certain strategy and creating a workable methodology apart from problem-solving, communication, and team-building skills. These parameters divide a project into different phases as defined by PMI's PMBOK

and understanding and applying these PM process will help to acquaint with project management process and why it is necessary to execute a project in specific steps.

The project lifecycle interacts with overall project management process. In predictive small projects, the project management processes will be followed throughout the entire project though some of the processes may be iterated throughout the cycle.
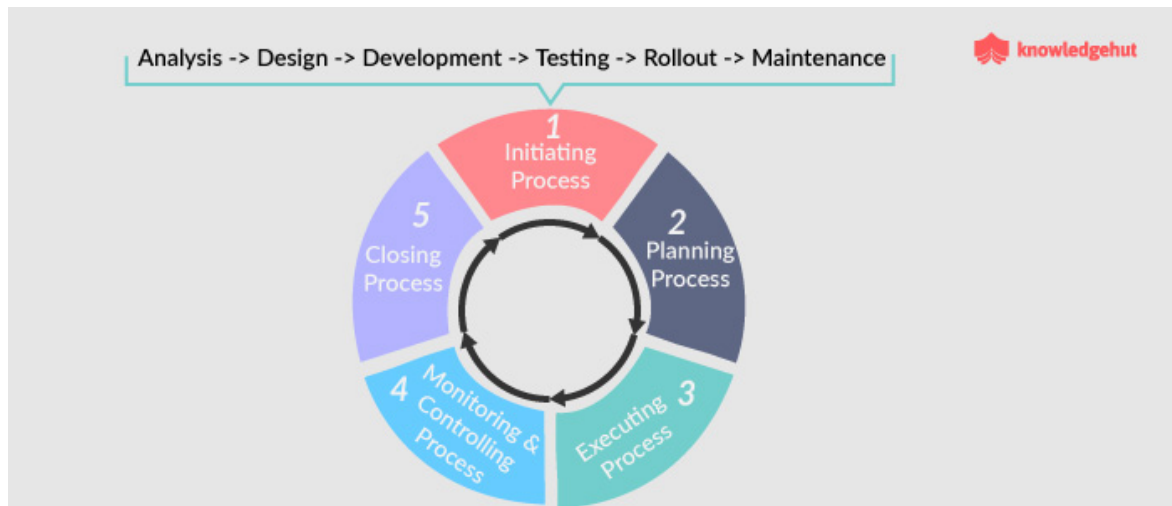
Figure 3: Project lifecycle interacts with overall project management process
Source: Ramkumar Armugam, 2019

However, ECO Cookstove Project will require each lifecycle phases to be managed by the process groups. An overall initiating effort will be done by the project manager leading to project charter creation and do high-level planning to get approvals. Once this is done, there will be separate phases for each stage in the project planning, execution, control, and closure which will typically hand out deliverables for that phase. Then the project management process will be repeated for the next stage of the project lifecycle.

The initiating process formally kickstarts the project or project phase. This involves identifying and analyzing stakeholders for alignment with their goals and objectives. This phase provides a guiding vision for the project that will help achieve high-level scope and any known constraints. The initiating phase formally gives the project manager the needed authority and information necessary to start the project.

Figure 4: The output of the initiating phase
Source: Ramkumar Armugam 2019

The output of the initiating phase is project charter and stakeholder register. Project Planning is a very important phase of any project that gives details about the project and helps in getting it organized before the start of the work. This presents a great opportunity to save time, cost, and resources. In the planning phase, the project manager and the team perform a detailed analysis of whether the project can be executed according to the details present in the project charter. Then they decide on how to achieve the strategic objectives through the project management process and knowledge areas. The project planning is iterative and not a one-time effort. This is because each process will use the results of the previous processes and may affect the outcomes. In the real world, the project plan and documents are revisited after identification of the risks, performing qualitative and quantitative risk analysis. The level of project planning by the project manager and the team always depends on the needs of the project. A highly visible project on an accelerated timetable with very limited variance demands detailed project planning rather than a low priority project with adjustable schedules.
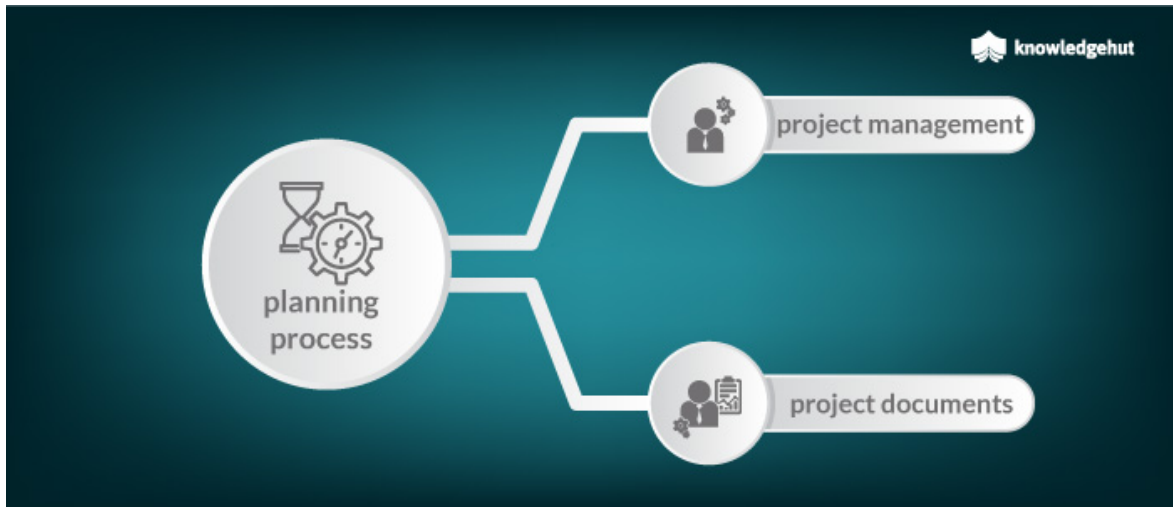
Figure 5: The output of the planning process
Source: Ramkumar Armugam 2019

The output of the planning process are project management plans and project documents that will provide directions for execution and control of the project. The objective of executing process group is to complete the work defined in the project management plans to meet the objectives. The main goal is to achieve the outcome by adhering to budget, timeline, and schedule as mentioned in the project management plan and project documents. This phase is where the actual work will be done and will be focused on managing process, people and communicating according to plan. The project manager constantly updates the project management plan and project documents to accurately reflect the current status of the project. He or she also creates issues log to record and maintain project issue details, resolution and also who will be responsible for resolving the issues within the time.

Monitoring and Controlling process will measure the actual performance of the project against project management plan and approving changes through change management including corrective and preventive actions along with defect fix. The project manager uses the project baseline documents (scope, cost, schedule) to compare against the actual performance and suggest course corrections. He/She also obtains formal acceptance of interim deliverables from the customer. If the project does not go according to plan due to scope changes, the project manager re-plans and makes

updates to the project management plans and project baseline documents to reflect the approved changes.
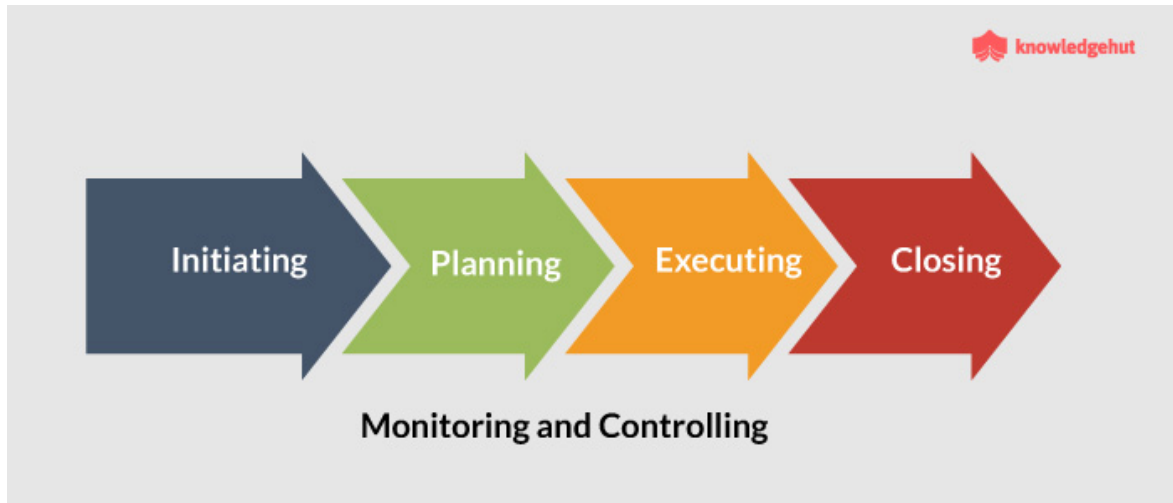
Figure 6: The monitoring and control process
Source: Ramkumar Armugam 2019
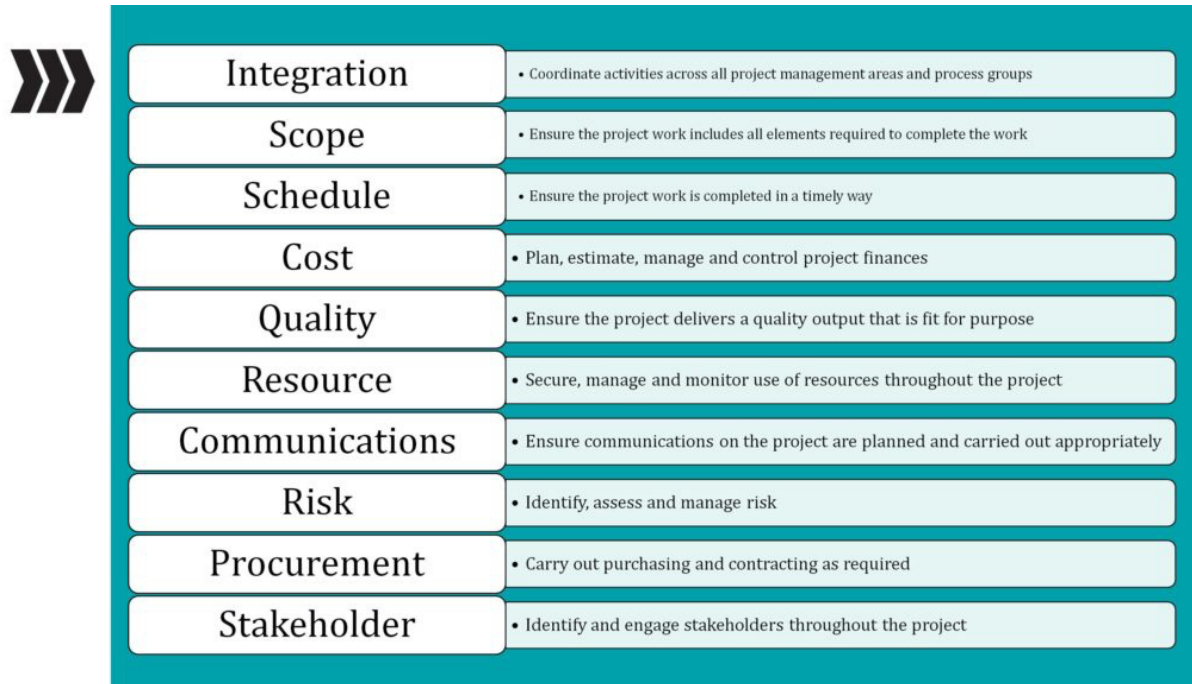
The final processes group is the closing group where the product scope is completed. This will have administrative activities including finalizing the paperwork needed to finish the project. The project will also have retrospectives from customers and team that goes into the "lessons learned" document. The project manager ensures all the project management documents are updated to complete status and hands off all project deliverables to appropriate stakeholders.

2.2.5 Project management knowledge areas

PMI defines a Knowledge Area in the PMBOK® Guide – Sixth Edition as an identified area of the project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools and techniques. In the Project Management Body of Knowledge (PMBOK) the groups process are the chronological phases that the project goes through, and the knowledge areas occur throughout any time during the process groups. These are the 10 Project Management knowledge areas: Project Integration Management, Project Scope Management, Project Schedule Management, Project Cost Management, Project Quality Management, Project Resource Management, Project Communications Management, Project Risk

Management, Project Procurement Management and, Project Stakeholder Management. Project management knowledge areas coincide with the process groups, which are project initiation, project planning, project execution, monitoring and controlling, and project closing. These are the chronological phases that every project goes through. The knowledge areas take place during anyone of these process groups.

Figure 7: Knowledge Areas of Project Management
Source: Elizabeth Harrin, 2019

2.2.5.1 Project Integration Management

The project integration management includes such fundamental plans as developing a project charter that is created during the initiation phase. This is the document that sets up the project and assigns the project manager. Another aspect of this area is the project management plan, which is developed as a roadmap for the project to reach a successful end. Once created, the project plan is approved by stakeholders and/or sponsors, and then it's monitored and tracked through a change log as the project progresses. The project integration area also includes the directing and managing of the project work, which is the production of its deliverables. This process is monitored,

analyzed and reported on to identify and control any changes or problems that might occur. Also, any change control will be carried out. That might require request forms, approval from stakeholders and/or sponsors or another admin. This area is also part of the project closure at the end of the project.
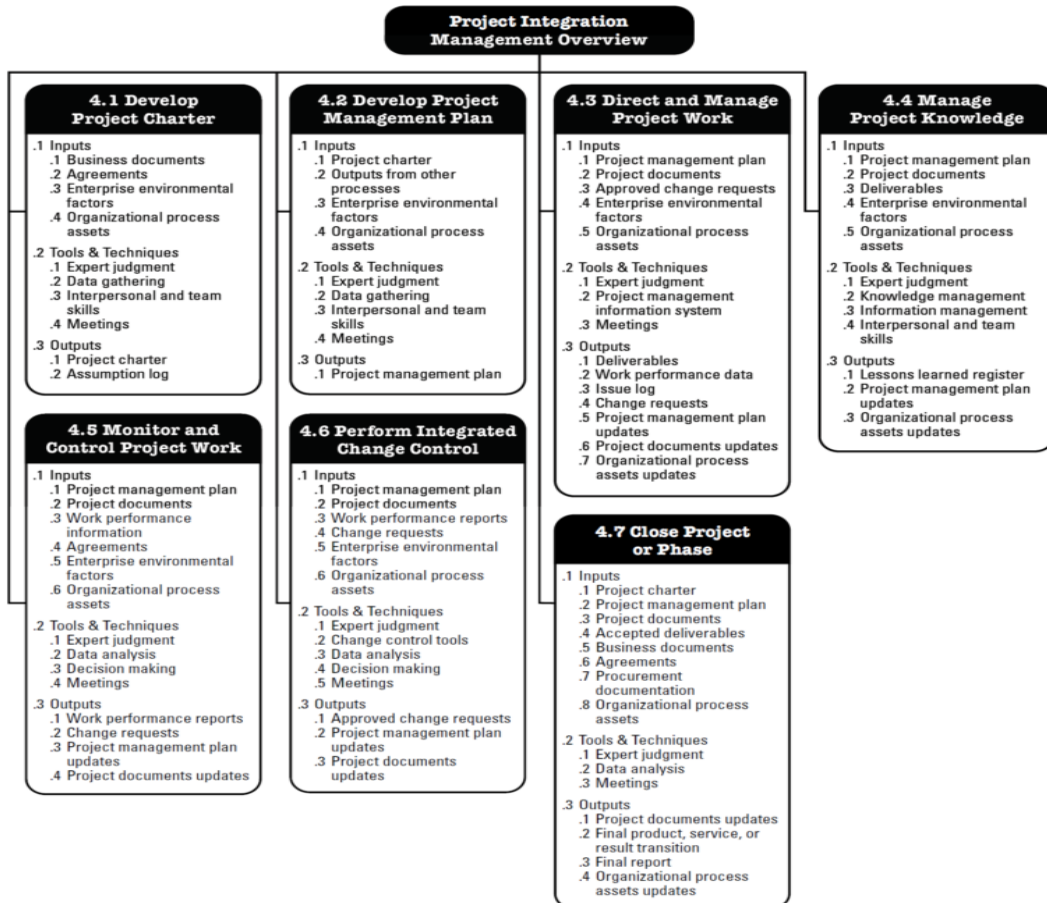
Figure 8: Inputs, Tools and Techniques to the Project Integration Management
Source: PMI, 2017

2.2.5.2 Project Scope Management

Scope relates to the work of the project. So, that includes plan scope management, which is part of the project management plan. It also is when a detailed requirement for the final product or service is collected. The scope statement is defined. This is anything from a sentence to a bulleted list that is comprehensive to reduce major project risks. And a Work Breakdown Structure (WBS), which is a graphic breakdown of project work,

is another part of this area. Validate scope during the project, which means making sure that the deliverables are being approved regularly by the sponsor or stakeholder. This occurs during the monitoring and controlling process groups and is about accepting the deliverables, not the specs laid out during planning. The scope statement is likely going to change over the course of the project to control the scope, such as if a project falls behind schedule.
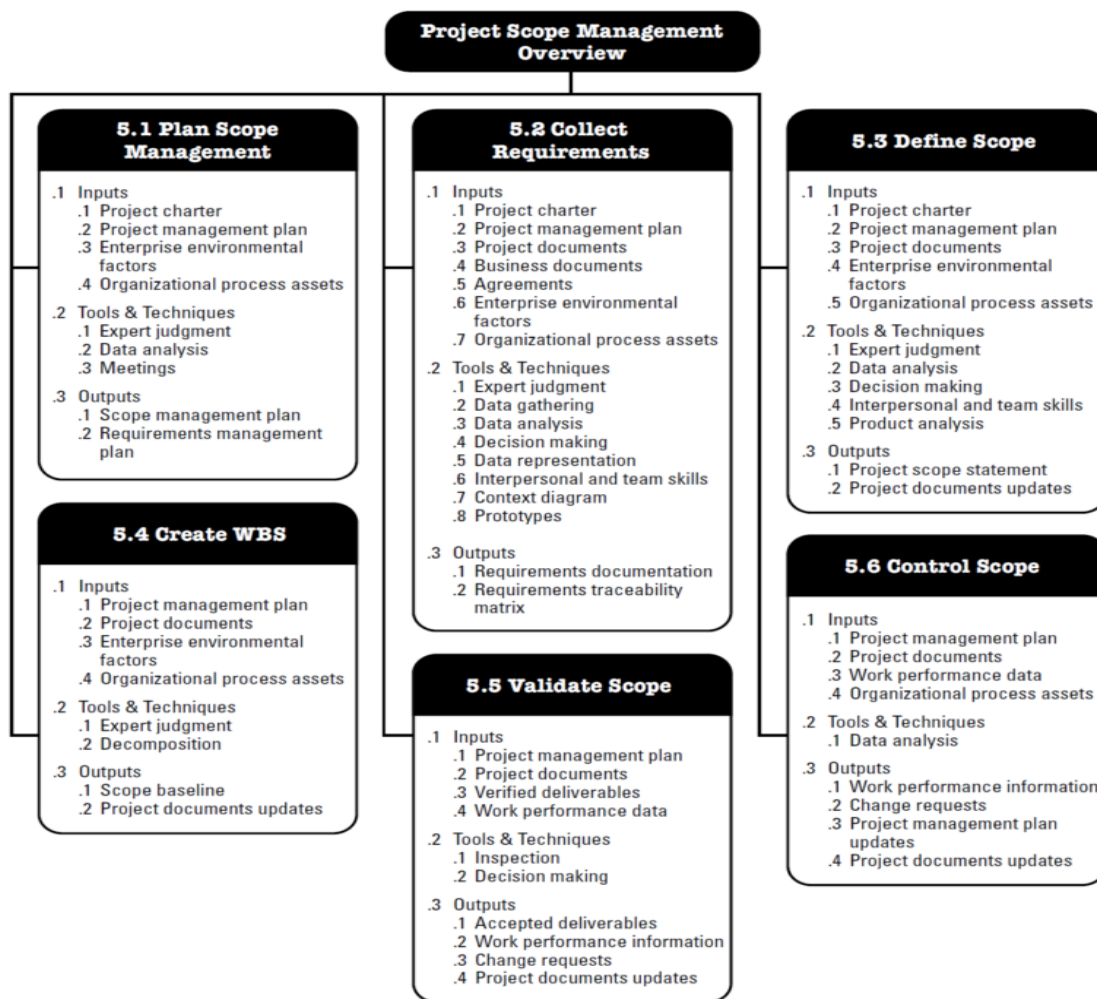
Figure 9: Inputs, Tools and Techniques to the Project Scope Management
Source: PMI, 2017

2.2.5.3 Project Schedule Management

This is usually the most time consuming of the knowledge areas. The project is divided into tasks, which are scheduled with start dates and deadlines, as well as budgets for

each task. And things are constantly changing over the phases of any project, which means revising these things often. This involves plan schedule management, which involves creating a schedule for the project and determining who is responsible for what. That means defining activities, which is not the same as making a WBS, but similar. So, you create a task list that touches on every aspect of the project. These tasks are then put in an order that makes sense, and any dependencies between them is noted. These dependencies are then determined to be either finish-to-start (FS), finish-to-finish (FF), start-to-start (SS) or start-to-finish (SF). This is mostly for larger projects. With the tasks now sequenced, the resources required for each must be estimated and assigned. The duration of each task is also determined at this point. All this will lead to a schedule by first figuring out the critical path and float for each task. Use a Gantt chart to place the tasks on a timeline, and then work on resource leveling to balance resource usage. Once the schedule is made, plan to control the schedule are necessary. Earned Value Management is performed regularly to make sure that the actual plan is proceeding as it had been planned.
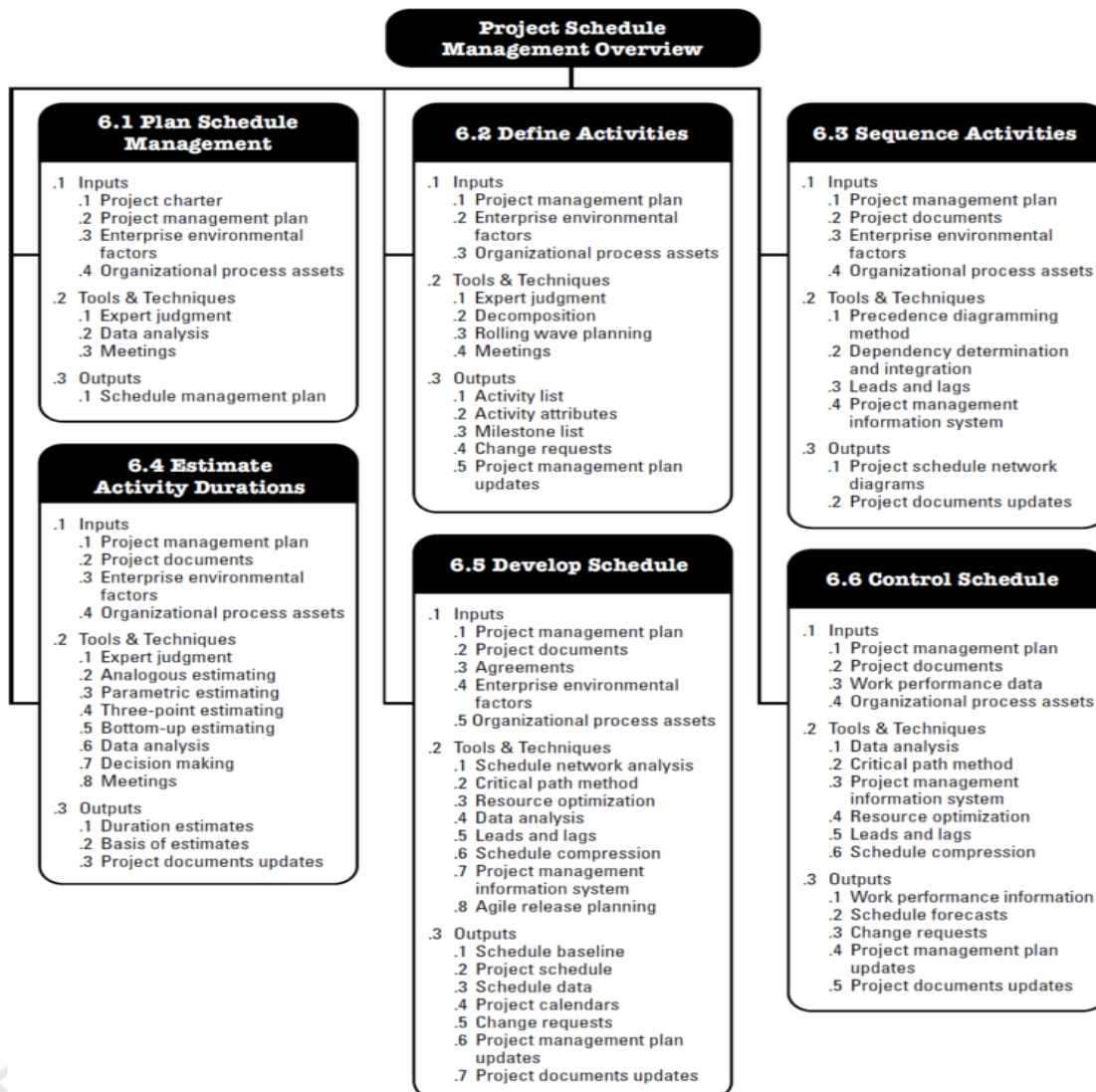
Figure 10: Inputs, Tools and Techniques to the Project Schedule Management
Source: PMI, 2017

2.2.5.4 Project Cost Management

This area involves the project budget, which means having good estimating tools to make sure that the funds cover the extent of the project and are being monitored regularly to keep stakeholders or sponsors informed. Plan cost management will determine the method to establish the budget, which includes how and if it will change and what procedures will be used to control it. Each task will have to be estimated for cost, which means including all resources such as labor, materials, equipment and

anything else needed to complete the task. This will determine the project budget, once you take all the task costs and combine them. Then comes the need to control those cost through an earned value analysis. This is performed regularly throughout the project to make sure the estimated costs are in line with actual expenditures.
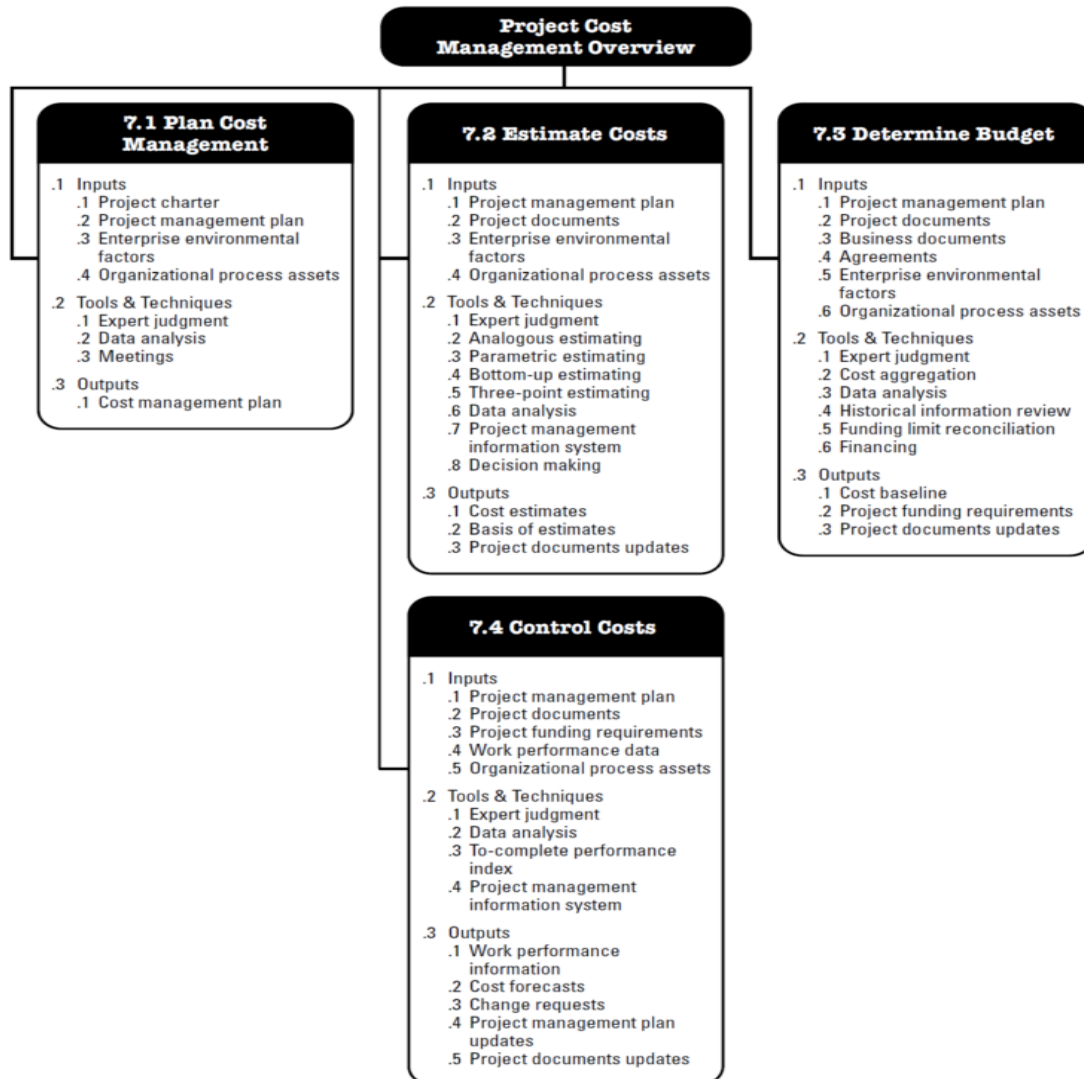
Figure 11: Inputs, Tools and Techniques to the Project Cost Management
Source: PMI, 2017

2.2.5.5 Project Quality Management

Plan quality management is part of the overall project management plan, though it can be a standalone document if it contains the quality specs for the product or service. The process needs to include quality assurance, which is just a way to make sure that

quality standards are being met. Therefore, to control quality, the deliverables must be inspected to make sure that those standards outlined in the quality management plan are being met.
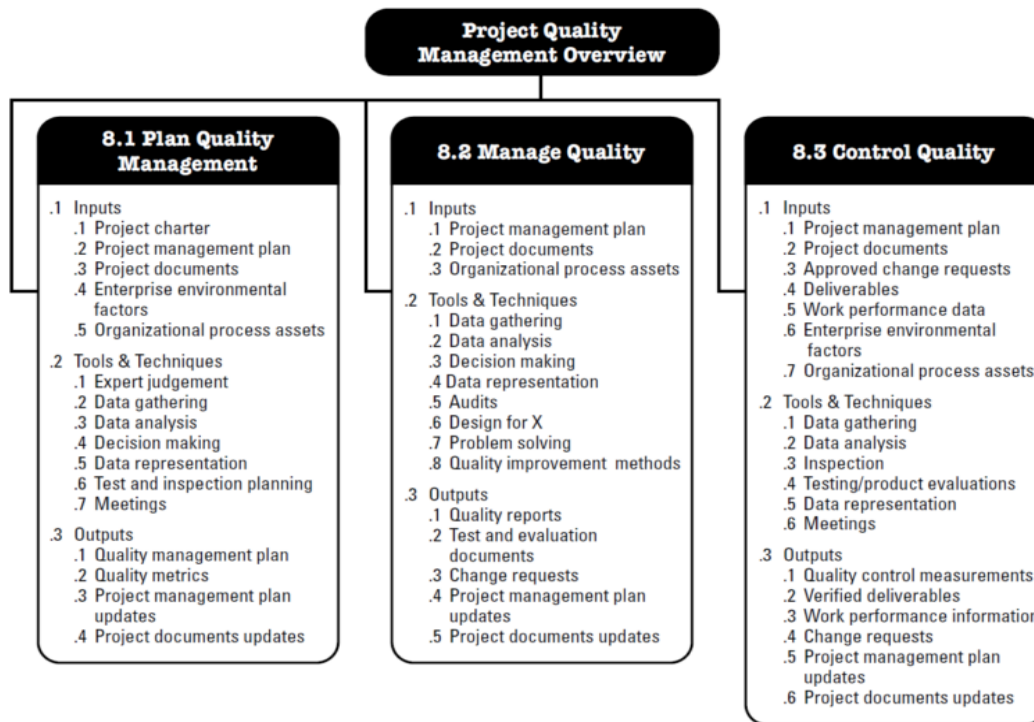
Figure 12: Inputs, Tools and Techniques to the Project Quality Management
Source: PMI, 2017

2.2.5.6 Project Resource Management

The project team is the most important resource, so it's crucial to assemble the best team and to make sure they're happy. But also, there is need to track their performance to ensure that the project is progressing as planned. A human resource management plan will identify their roles and their requirements for those positions, as well as how they fit in the overall project structure. After determining the job descriptions, it's time to fill those positions and acquire a project team. This can be done in-house by drawing from other departments in the organization, by getting new hires or by a combination of both. The team needs development, possibly training and other things that will make them viable for the project. Managing the project team is an ongoing responsibility of the

project manager. The team is monitored to make sure they're working productively and that there are no internal conflicts, so everyone is satisfied.
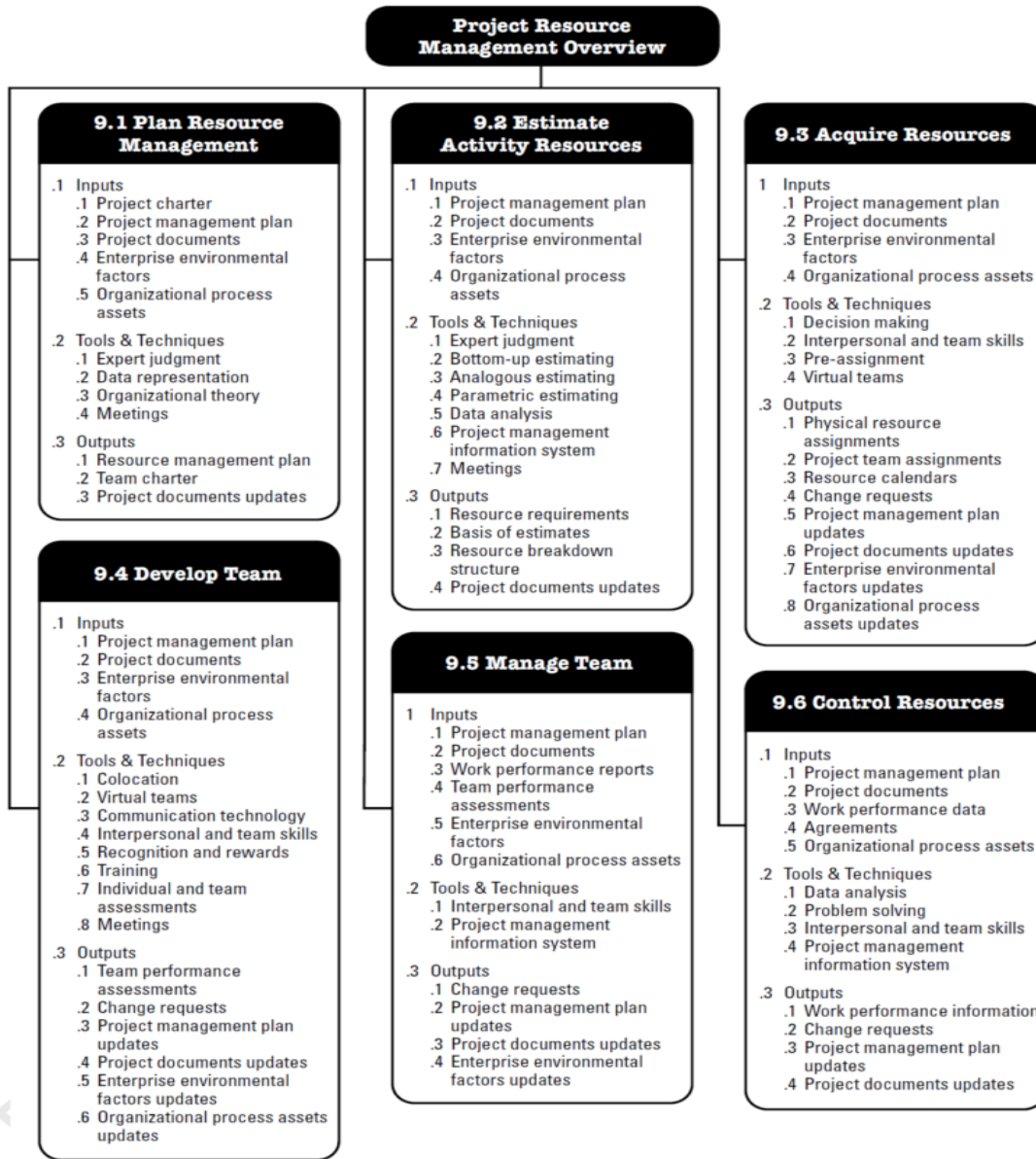
Figure 13: Inputs, Tools and Techniques to the Project Resource Management
Source: PMI, 2017

2.2.5.7 Project Communications Management

All areas of project management are important, but communications might be paramount as it informs every aspect of the project. Communications inform the team

and stakeholders, therefore the need to plan communications management is a critical step in any project. It is at this point that the dissemination of communications is determined, including how it's done and with what frequency. Target who needs what and when. Also, note how communications will occur when issues arise in the project, such as changes. Manage the communications when the project is executed to make sure it runs as planned. This will also involve controlling communications by reviewing their effectiveness regularly and adjusting as needed.
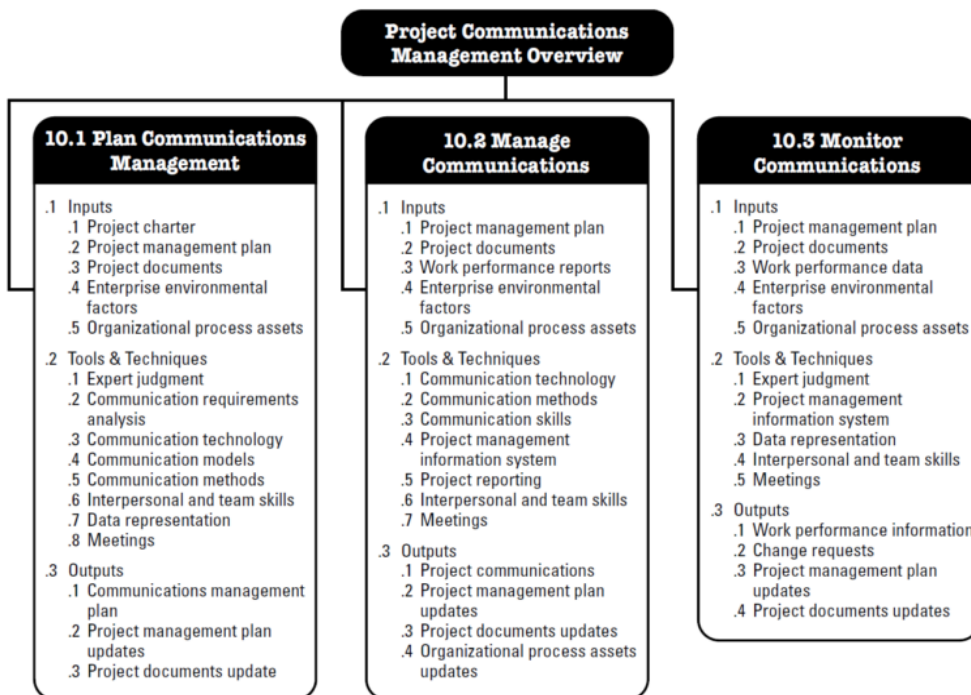
Figure 14: Inputs, Tools and Techniques to the Project Communication Management
Source: PMI, 2017

2.2.5.8 Project Risk Management

Risk management plans will identify how the risks will be itemized, categorized and prioritized. This involves identifying risks that might occur during the execution of the project by making a risk register. Perform qualitative risk analysis after the biggest risks have been identified and classified by likelihood and impact. Then prioritize them. Then perform quantitative analysis according to their impact on the project, such as its budget, schedule, etc. There is need to plan risk responses. If those risks in fact

become issues, then a response needs to have been written in advance, with an owner who can make sure the risk is properly identified and handled. Controlling risk involves regularly reviewing the risk register and crossing off those risks that are no longer going to impact the project.
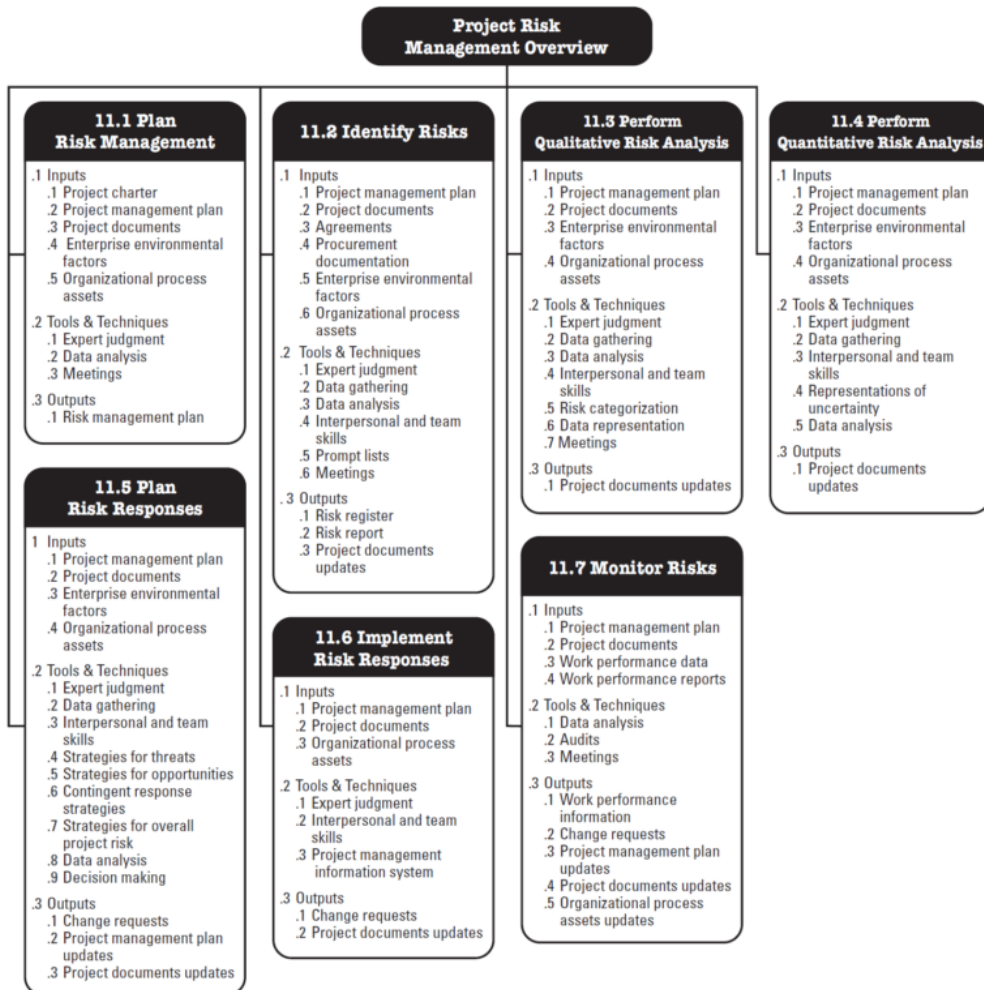
Figure 15: Inputs, Tools and Techniques to the Project Risk Management
Source: PMI, 2017

2.2.5.9 Project Procurement Management

This deals with outside procurement, which is part of most projects, such as hiring subcontractors. This will obviously have an impact on the budget and schedule. Planning procurement management starts by identifying the outside needs of the project and how those contractors will be involved. Now conduct those procurements by hiring

the contractors, which includes a statement of work, terms of reference, request for proposals and choosing a vendor. You'll want to control the procurement process by managing and monitoring, and then closing the contracts once the work has been done to everyone's satisfaction.
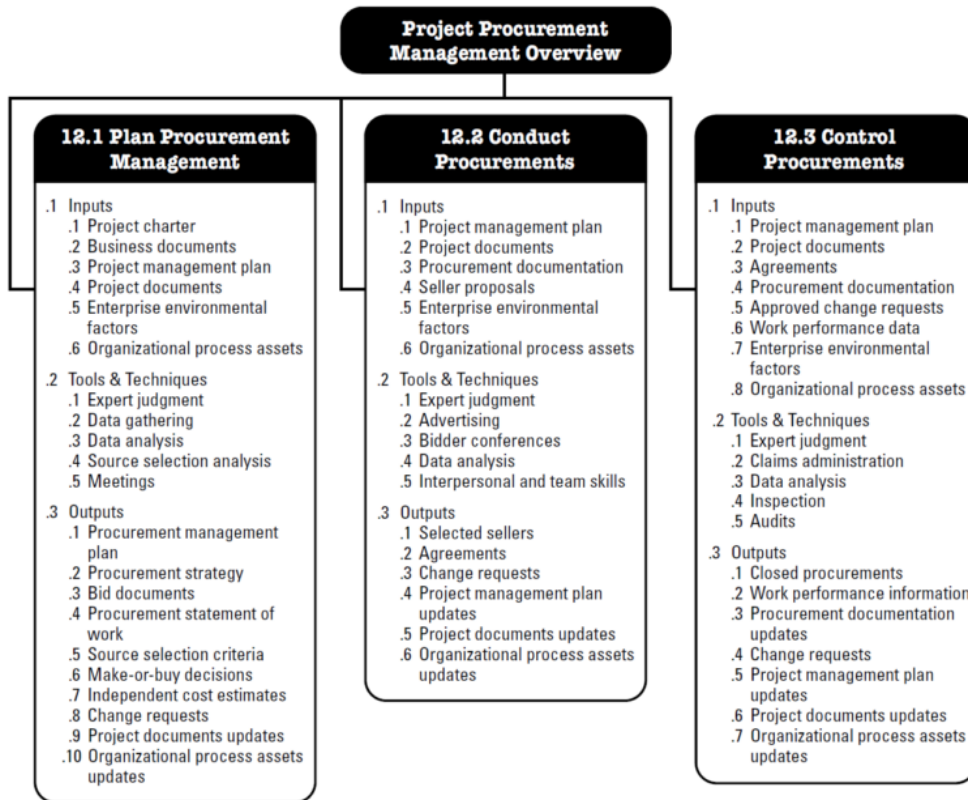
Figure 16: Inputs, Tools and Techniques to the Project Procurement Management
Source: PMI, 2017

2.2.5.10 Project Stakeholder Management

The stakeholders must be happy, as the project has been created for their needs. Therefore, they must be actively managed like any other part of the project. To start one must identify the stakeholders. It's not always easy, but it's a crucial part of starting any project, so find out who they are and what concerns they have. Stakeholder management are planned, which means listing each stakeholder and prioritizing what their concerns are and how they might impact the project. This will lead to managing stakeholders' expectations to make sure their needs are met and that you're in communication with them.
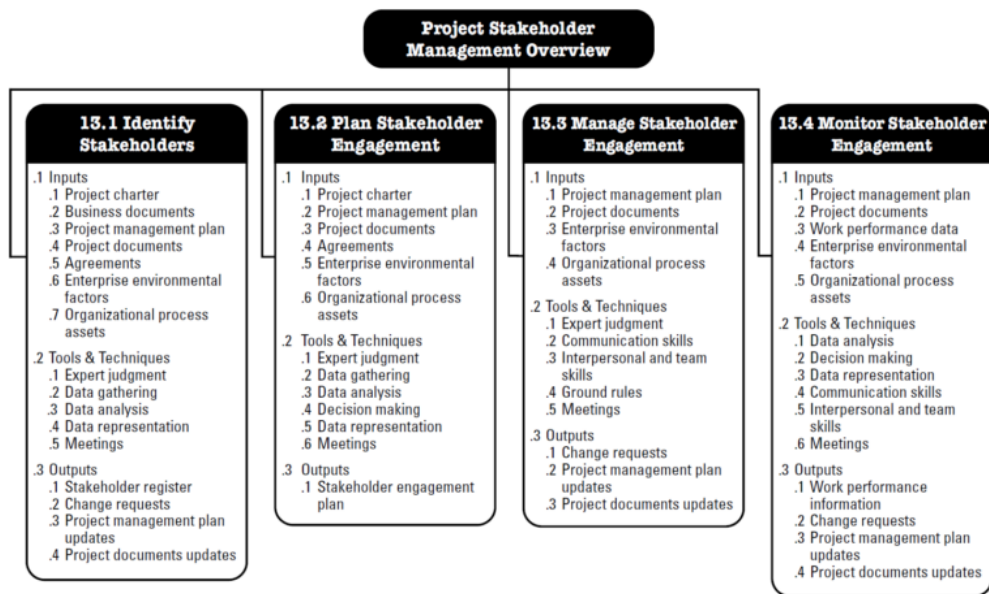
Figure 17: Inputs, Tools and Techniques to the Project Stakeholder Management
Source: PMI, 2017

Throughout the project, there is need to control stakeholder engagement by determining if the stakeholders' needs are being addressed. If not, then figure out what changes need to be made to either satisfy those needs or adjust the expectations.

2.3 Other applicable theory/concepts related to the project topic and context

2.3.1 Environmental and social effects

This project expects to have significant social and environmental benefits. First, the transition from traditional to improved cookstoves will result in significant reductions in GHG emissions and firewood consumption. The component parts of cookstoves are made of conventional and construction materials (cement, bricks, steel, and wood ash from bakeries for insulations) and are not expected to have positive or negative environmental impacts associated with their use. Second, the project will have important positive social impacts on the health of women in from poor and extreme poor households. In conformity with Green Climate Fund's environmental and social policy dated March 2018, project activities have been assessed against GCF's environmental and social safeguards (ESS1 to ESS8). The interim standards of the GCF

Environmental and Social Performance Standards (PS) are shown in the table below. They will be referred to indistinctively as ESS or PS.

Table 3: GCF's Environmental and Social Performance Standards (PS) safeguards 2018

ESS1	PS1: Assessment and management of environmental and social risks and impacts
ESS2	PS2: Labour and working conditions
ESS3	PS3: Resource efficiency and pollution prevention
ESS4	PS4: Community health, safety and security
ESS5	PS5: Land acquisition and involuntary resettlement
ESS6	PS6: Biodiversity conservation & sustainable management of living natural resources
ESS7	S7: Indigenous peoples
ESS8	PS8: Cultural heritage

Notes, corresponding to each Performance Standard, and the additional Interpretation Note on Financial Intermediaries. Through the assessment, special attention should be given to (i) gender and (ii) human rights, which are cross-cutting in the ESS, and are quoted separately in ECO's environmental and social policy.

The project has also been assessed for compliance with ECO's Safeguards and Gender (S+G) management system. ECO's safeguards and gender management system includes:

   i)   environment and climate safeguard

   ii)   human rights safeguard

   iii) context and conflicts sensitivity safeguard

   iv) gender impacts and mainstreaming.

2.3.2 Grievance redress mechanism

The project teams discuss how to set up an effective grievance mechanism, as required under ESS1. The project has a large scale of intervention (both geographically and in terms of number of beneficiaries) and a very low potential for negative impacts. For category A projects, grievance mechanisms can take different forms, for instance a general phone number, e-mail address, and local communication centres where people

can log potential complaints. But such mechanisms are not adapted for an ICS market growth acceleration project, as they could be confused with after-sales services for stoves. Project grievance mechanisms should be adapted to collecting and treating complaints which are directly related to potential negative project impacts. Although it is not possible to foresee all potential reasons for complaints, some of them could be:

- environmental degradation, nuisances or improper land use from supported producers
- unfair competition from supported entrepreneurs
- misuse of financial support by entrepreneurs
- inappropriate conduct of project staff
- etc.

2.3.3 Human rights

The project will be screened with regards to ECO's human rights safeguards. The screening will be based on ESS2 (labour), ESS5 (involuntary resettlement), ESS7 (indigenous peoples) and prevention of discrimination and right to participation (both included under ESS1).

2.3.4 Gender impacts and gender mainstreaming

To ensure full conformity ECO's policy on gender impacts and mainstreaming, a separate gender assessment has been conducted for the project, and a Gender Action Plan has been developed. Information on the gender situation in the country, as well as on the situation of special interest groups such as youth, older members of society, vulnerable persons, marginalized groups and marginalized communities will be generated

3   METHODOLOGICAL FRAMEWORK

3.1   Information sources

Sources of information are broadly classified in two categories, primary and secondary. According to Parasuraman et al. (2004) primary data are the information collected for the first time to bring about any explicit needs of a particular research. They are the firsthand descriptions represented by research reports, published in a scientific journal or periodical to reflect on the observations performed by the researcher (Gravetter & Forzano, 2008). Furthermore, they also facilitate authors to illustrate their research by answering and substantiating against the questions or uncertainties rose during the progression of investigation. Like, why and how study was undertaken, what results were found, and how those results were interpreted. However, course of primary data collection entails a range of diverse means. They are, personal or emails-based survey questionnaires, face to face or telephone interviews, observations and focus groups (Ghauri & Gronhaug, 2005).

Primary data is often more consistent with the research questions and objectives. Under this method of data gathering questions can be formed both formal and informal ways (Parasuraman et al. 2004). Yet, success of this approach relay largely upon the capabilities of the researcher, who pose the questions to the respondents (Bryman & Bell, 2003). Major downside of this data source is that they require ample amount of time and may consume lot of money (Malhotra & Bricks, 2007). Since the researcher is completely dependent on the willingness and ability of the respondents, at times it becomes very hard to approach respondents (Kanikapati, 2007).

Secondary data is detailed information accessed by the researcher through other available sources of information to obtain thorough literature review. In fact, most of the studies begin in that fashion (Kanikapati, 2007). It is a second-hand report where the observations of different authors will be discussed by the researcher to accomplish aspired objectives (Gravetter & Forzona, 2008). Generally secondary information is of high standards (Bryman & Bell, 2003) and fundamentally used to understand and explain research problems better. Secondary source of data is very easy to extract and

available in plenty through, books, magazines, journals, articles, websites and etc. More importantly it is inexpensive and time saving but, its basic nature of collection for different purposes during different time span with different objectives makes it less effective to robust into present study.

3.1.1 Primary sources

According to Schmidt, (2013), a primary source is information taken directly from a person, event, location, or material at the point of the occurrence". According to Persaud, N. (2010), The term primary source is used broadly to embody all sources that are original. A primary source is an original document or other piece of material that was created at the time of the actual events or within its time period. The material is ideally created by someone who is known and can be named, and it was produced for a known purpose. A primary source "provides direct or first-hand evidence" or eyewitness account of an event, object, person, or any subject under investigation. For the development of the Final Graduation Project, the primary information sources that will be used include the following. Interviews and Observation, Original manuscripts, Audio recordings, Original documents and artifacts, Personal diaries, letters, emails, Photographs and video recordings, Meeting minutes, Original Survey results/reports, Newspaper articles with original reporting, Internet Communications via email, ECO Official and Unofficial Records and Technical Reports, among others

3.1.2 Secondary sources

A secondary source is information that a person provides after he or she has gotten the information from a primary source (Schmidt, 2013). A *secondary source*, as described In W. Paul Vogt (Ed.) Secondary Source (2005), is a source that provides non-original or secondhand data or information. Secondary sources are written about primary sources and describe, discuss, interpret, comment upon, analyze, evaluate, summarize, and process primary sources. Whereas primary sources are generally the original material, a secondary source builds upon one or more primary sources. Often, secondary sources will interpret, analyze, explain or describe content from primary sources. For the development of the Final Graduation Project, the secondary

information sources that will be used include the following: Textbooks, Magazine articles (particularly opinion pieces), Documentary films, Second-hand news reporting, Previous Research, Government Reports, Web Information, Historical data and information, Reference Books like PMBOK® Guide, Articles from journals, and newspapers after the event, Literature Reviews, Review Articles, among others

Table 4: Information sources (Source: C. Kabiswa, Author, June 2019)

Objectives	Information sources	
	Primary	Secondary
1. To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan.	Interviews, Observation, Internet Communications via email, Photographs, Newspaper Articles, Official and Unofficial Records of Organization and Technical Reports,	Previous Research, Government Reports, Web Information, Historical data and information, Reference Books like PMBOK® Guide, Articles from magazines, journals, and newspapers after the event, Literature Reviews, Review Articles
2.To create a scope management plan to ensures that all works required are included to successfully complete the project.	Interviews, Observation, Internet Communications via email, Photographs, Newspaper Articles, Official and Unofficial Records of Organization, ECO Accounting Records, Technical Reports,	Previous Research, Government Reports, Web Information, Historical data and information, Reference Books like PMBOK® Guide, Articles from magazines, journals, and newspapers after the event, Literature Reviews, Review Articles
3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints	Interview, Observation, Case Studies, Official and Unofficial Records of Organization	Previous Research, Official Statistics, Diaries, Letters, Government Reports, Web Information, Historical data and information, Literature Reviews, Review Articles, Textbooks, Books like PMBOK® Guide
4.To create a cost management plan to define the processes for developing and managing the project budget that ensures the project is completed within the	Interviews, Observations, Case Studies, Questionnaires, Correspondence, Internet Communications on Email, Books, Newspaper Articles, Official and Unofficial records	Previous Research, Official Statistics, Government Reports, Web Information, Historical data and information, Articles newspapers after the event,

Objectives	Information sources	
	Primary	**Secondary**
budget constraints	of Organization, Video recordings, Technical Reports	Books like PMBOK® Guide
5.To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.	Interviews, Observations, Case Studies, Questionnaires, Correspondence, Internet Communications on Email, Books, Newspaper Articles, Official and Unofficial records of Organization, Technical Reports	Previous Research, Official Statistics, Government Reports, Web Information, Historical data and information, Articles newspapers after the event
6.To create a human resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints.	Interviews, Observations, Case Studies, Correspondence, Internet Communications on Email, Books, Newspaper Articles, Official and Unofficial records of HR Organization, Technical Reports	Previous Research, Official Statistics, Government Reports, Web Information, Historical data and information, Articles newspapers after the event, Books like PMBOK® Guide
7. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.	Interviews, Observations, Case Studies, Correspondence, Internet Communications on Email, Books, Newspaper Articles, Official and Unofficial records of Organization, Technical Reports	Previous Research, Official Statistics, Diaries, Letters, Government Reports, Web Information, Historical data and information, Articles newspapers after the event
8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.	Interview, Observation, Questionnaires, Correspondence, Internet Communications, Books, Newspaper documents, Organizational Process Assets (OPA)	Previous Research, Official Statistics, Government Reports, Web Information, Historical data and information, Reference Books like PMBOK® Guide, Review Articles, Textbooks
9. To develop a procurement management plan to be used to obtain products, services or results required by the project.	Interviews, Observations, Case Studies, Correspondence, Internet Communications on Email, Books, Newspaper Articles, ECO Official and Unofficial records, Technical Reports	Previous Research, Official Statistics, Government Reports, Web Information, Historical data and information, Reference Books like PMBOK® Guide, Review Articles, Textbooks

Objectives	Information sources	
	Primary	**Secondary**
10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.	Interview, Observation, Action Research, Case Studies, Questionnaires, Correspondence, Internet Communications on Email, Newsgroups, Books, Newspaper Articles, Official and Unofficial records of Organizations, Video recordings, Technical Reports, OPA	Previous Research, Official Statistics, Government Reports, Web Information, Historical data and information, Reference Books like PMBOK® Guide, Review Articles, Textbooks

3.2   Research methods

Research is used to describe a number of similar and overlapping activities relating a search for information. It is "something that people undertake in order to find things out in a systematic way, thereby increasing their knowledge" (Saunders et al. 2009). According to Kothari (2004), endeavour of any research is to uncover the concealed reality that is yet to be exposed or revealed. However, research is constantly used to solve organizational problems through systematic strategies (Ojo, 2008). Research method is defined as the tools or an instrument that is used to accomplish the goals and attributes of conducting a research process.

3.2.1 Qualitative Research

As explained by Creswell (2013), the qualitative research approach "involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data." Qualitative research is a research method that collects data using conversational methods, where participants involved in the research are asked open-ended questions. The responses collected are essentially non-numerical. This method not only helps a researcher understand "what" participant think but also, "why" they think in a particular way.

3.2.2 Quantitative Research

In 2013, Creswell's research defined the quantitative research approach as "testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures." Quantitative research methods are the methods that deal with numbers and anything that can be dealt with a measurable form, in a systematic way of investigating the phenomenon. It is used to answer questions in terms of justifying relationships with measurable variables to either explain, predict or control a phenomenon.

3.2.3 Analytical Research

Kothari (2004) described analytical research thus "the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material." Analytical research is a specific type of research that involves critical thinking skills and the evaluation of facts and information relative to the research being conducted. It involves the in-depth study and evaluation of available information in an attempt to explain complex phenomenon. Analytical Research is primarily concerned with testing hypothesis and specifying and interpreting relationships, by analyzing the facts or information already available

Table 6: Research methods (Source. C. Kabiswa, Author, June 2019)

Objectives	Research methods		
	Qualitative methods	**Quantitative methods**	**Analytical methods**
1. To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan.	This method is used to provide direct or first-hand evidence when creating the project charter.	This method involves emerging questions and procedures, data typically collected, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data when creating the project charter.	The analytical method will be employed by using facts or information from the sources identified in Chart 1 objective 1 above, to drive decision making when creating the project charter.
2. To create a scope management plan to ensures that all works required are included to successfully complete the project.	This method provides insight into various key components of this knowledge area; is a basis For further research and offers an indication of how and why decisions are made about scope management.	This method analyses statistical records to describe variables to determine contributory proceedings between causal scope factors and to facilitate the best projections of future outcomes in this knowledge area.	The analytical method will be employed by using facts or information from the sources identified in Chart 1 objective 2 above, to drive decision making when creating the documents which comprise the scope management plan.
3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints	This method provides insight into various key components of this knowledge area; is a basis For further research and offers an indication of how and why decisions are made about schedule management.	This method will be employed to analyse statistical records to describe variables to determine contributory proceedings between causal schedule factors and to facilitate the best projections of future outcomes in this knowledge area.	The analytical method will be employed by using information from the sources identified in Chart 1 objective 3 above, to drive decision making when creating the documents that will comprise the time management plan.
4. To create a cost management plan to define the processes for	This method provides insight into various key components of this knowledge area; is a basis	This method analyses statistical records to describe variables to determine	The analytical method will be employed by using information from the

Objectives	Research methods		
	Qualitative methods	Quantitative methods	Analytical methods
developing and managing the project budget that ensures the project is completed within the budget constraints	For further research and offers an indication of how and why decisions are made about cost management.	contributory proceedings between causal cost factors and to facilitate the best projections of future outcomes in this knowledge area.	sources identified in Chart 1 objective 4 above, to drive decision making when creating the documents that will comprise the cost management plan.
5.To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.	This method provides insight into various key components of this knowledge area; is a basis For further research and offers an indication of how and why decisions are made about quality management.	This method analyses statistical records to describe variables to determine contributory proceedings between causal quality factors and to facilitate the best projections of future outcomes in this knowledge area.	The analytical method will be employed by using information from the sources identified in Chart 1 objective 5 above, to drive decision making when creating the documents that will comprise the quality management plan.
6.To create a resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints.	This method will provide insight into various key components of this knowledge area; is a basis for further research and offers an indication of how and why decisions are made about resource management.	This method analyses statistical records to describe variables to determine contributory proceedings between causal resource factors and to facilitate the best projections of future outcomes in this knowledge area.	The analytical method will be employed by using information derived from the sources identified in Chart 1 objective 6 above, to drive decision making when creating the documents that will comprise the human resource management plan.
7. To develop a communication management plan to ensure the timely and effective communication of the project status and other	This method provides insight into various key components of this knowledge area; is a basis For further research and offers an indication of how and why	This method analyses statistical records to describe variables to determine contributory proceedings between causal communication factors and to	The analytical method will be employed by using information derived from the sources identified in Chart 1 objective 7 above, to drive decision making when

Objectives	Research methods		
	Qualitative methods	Quantitative methods	Analytical methods
key information.	decisions are made about communication management	facilitate the best projections of future outcomes in this knowledge area.	creating the documents that will comprise the communications management plan
8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.	This method provides insight into various key components of this knowledge area; is a basis for further research and offers an indication of how and why decisions are made about risk management.	This method analyses statistical records to describe variables to determine contributory proceedings between causal risk factors and to facilitate the best projections of future outcomes in this knowledge area.	The analytical method will be employed by using information derived from the sources identified in Chart 1 objective 8 above, to drive decision making when creating the documents that will comprise the risk management plan.
9. To develop a procurement management plan to be used to obtain products, services or results required by the project.	This method provides insight into various key components of this knowledge area; is a basis for further research and offers an indication of how and why decisions are made about procurement management.	This method analyses statistical records to describe variables to determine contributory proceedings between causal procurement factors and to facilitate the best projections of future outcomes in this knowledge area.	The analytical method will be employed by using information derived from the sources identified in Chart 1 objective 9 above, to drive decision making when creating the documents that will comprise the procurement management plan
10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.	This method provides insight into various key components of this knowledge area; is a basis For further research and offers an indication of how and why	This methodical sampling method analyses statistical records to describe variables to determine contributory proceedings between causal stakeholder factors and to	The analytical method will be employed by using information derived from the sources identified in Chart 1 objective 10 above, to drive

Objectives	Research methods		
	Qualitative methods	**Quantitative methods**	**Analytical methods**
	decisions are made about stakeholder management.	facilitate the best projections of future outcomes in this knowledge area.	decision making when creating the documents that will comprise the stakeholder management plan.

3.3 Tools

The PMBOK® Guide (2017) defines tools as something "Something tangible, such as a template or software program, used in performing an activity to produce a product or result." Examples include: Analytical techniques Project management information system(s), Benchmarking, Product analysis.

Table 7: Tools (Source: C. Kabiswa, Author, June 2019)

Objectives	Tools
1. To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan.	Project Charter template Expert judgment Project Management Plan template WBS Schedule Pro
2. To create a scope management plan to ensures that all works required are included to successfully complete the project.	Requirements traceability matrix template, Requirements Documentation template, Requirements Management Plan template, Work Breakdown Structure generator, and Scope Management Plan template
3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints	Gantt Chart PERT Critical Path Method Critical Chain Method
4. To create a cost management plan to define the processes for developing and managing the project budget that ensures the project is completed within the budget constraints	Expert judgment Analogous estimating Parametric estimating Bottom-up estimating Three-point estimating Reserve analysis Cost of quality Vendor bid analysis
5.To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.	Cost-benefit analysis Cost of quality Seven basic quality tools Benchmarking Design of experiments Statistical sampling Additional quality planning tools Meetings
6.To create a resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints.	Expert judgment Data representation Meetings Bottom-up estimating Analogous estimating Data analysis Pre-assignment Negotiation

Objectives	Tools
7. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.	Communication technology Communication models Communication methods Information management systems Performance reporting
8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.	Power and interest Power and influence Influence and impact Power, urgency and legitimacy
9. To develop a procurement management plan to be used to obtain products, services or results required by the project.	Risk Management Planning Risk Identification Qualitative and Quantitative Risk analysis Risk response Planning Risk Monitoring and Control Expert judgment Documentation reviews Information gathering techniques Checklist analysis Assumptions analysis Diagramming techniques SWOT analysis
10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.	Make or-buy analysis Expert judgment Market research Meetings

3.4 Assumptions and constraints

According to PMBOK® Guide 6th Edition, Project Assumption is "A factor in planning process that is considered to be true, real or certain often without any proof or demonstration". Another definition could be "Project Assumptions are events or circumstances that are expected to occur during the project life-cycle". According to Study Circle (2016) "assumption is a belief of what you assume to be true in the future" and that assumptions are made based on your "knowledge, experience or the information available on hand" and are anticipated events or circumstances that are expected to happen during your project's life cycle.

According to PMBOK® Guide, Project Constraint is "A limiting factor that affects the execution of a project, program, portfolio or a process". Another definition could be "Project Constraints are restrictions imposed by Stakeholders or Environment that limits

Project Team's options". Constraints are defined as "limitations imposed on the project, such as the limitation of cost, schedule, or resources, and you have to work within the boundaries restricted by these constraints" and that all "projects have constraints, which are defined at the beginning of the project". Study Circle (2016). The PMBOK® Guide identifies six project constraints: scope, quality, schedule, budget, resource and risk. However, three of these scope, schedule, and budget are commonly referred to as the triple constraints. The assumptions and constraints considered on the Final Graduation Project for each specific objective are set out in table 8 below.

Table 8: Assumptions and constraints (Source: C. Kabiswa, The Author, 2019)

Objectives	Assumptions	Constraints
1. To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan.	The Charter will be created before all other subsidiary documents	Time allocated to create the project charter may not be enough
2. To create a scope management plan to ensures that all works required are included to successfully complete the project.	The project scope will be defined and will identify all the work required.	The scope may change as the project progresses.
3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints	The time allocated for the development of the Project Management Plan and the production of ECO Improved cookstoves is realistic and sufficient.	Not enough expert judgment available to provide expert guidance.
4. To create a cost management plan to define the processes for developing and managing the project budget that ensures the project is completed within the budget constraints	The budget developed during planning will accurately depict the financial resources required for production and distribution of ECO improved cookstoves	Not enough time and resources available to complete a detailed budget
5.To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.	The quality management plan will identify all of the technical and managerial quality requirements of the project.	Stakeholders' requirements may change as well as their level of interest.
6.To create a human resource management plan to ensure that all	The organization has sufficient human resource	Some roles and responsibilities may not

Objectives	Assumptions	Constraints
human resources are identified and managed effectively to complete the project within time, cost and scope constraints.	o complete the project. The team development plans for the project team and subcontractors will be sufficient to begin the production of the ECO ICS production on time.	be identified and someone not assigned to own those roles and responsibilities.
7. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.	All line of command and authority will be documented.	Some communication methods may not be available.
8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.	All risk will be appropriately budgeted for.	Some risk may occur because of other constraints
9. To develop a procurement management plan to be used to obtain products, services or results required by the project.	All good and services will be procured locally and the pre-qualified list of suppliers available	The list of suppliers may not be exhaustive and some suppliers may not have the required goods available locally.
10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.	All stakeholder requirements will be identified along with their level of interest.	Stakeholder requirements and level of interest may change during the project.

3.5 Deliverables

According to PMBOK® Guide 6th Edition, (2017) a deliverable is defined as "any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project". A Project Deliverable is a product or service that a project produces for its customer, client, or project sponsor. It is the product or service that the project "delivers" to its stakeholders. It can be tangible or intangible, for example, a contractor who is hired to provide a training course provides the course itself back to their client as the project's deliverable.

Table 9: Deliverables (Source: C. Kabiswa, Author, June 2019)

Objectives	Deliverables
1.To create a project charter that formally authorizes the project and provide the project manager with the authority to apply organizational resources to the project in order to produce the project management plan	Project Charter
2. To create a scope management plan to ensures that all works required are included to successfully complete the project.	Scope Management Plan Requirements Management Plan Requirements Document and Requirements Traceability Matrix
3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints	Schedule Management Plan, Activity List, Schedule Network Diagram, Resource assignments and activity durations, and Schedule in Gantt chart
4. To create a cost management plan to define the processes for developing and managing the project budget that ensures the project is completed within the budget constraints	Cost Management Plan, Cost Baseline and Project Funding Requirements
5. To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.	Quality Management Plan
6.To create a resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints.	Resource Management Plan
7. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.	Communication Management Plan and Communications Matrix
8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.	Risk Management Plan and Risk Register
9. To develop a procurement management plan to be used to obtain products, services or results required by the project.	Procurement Management Plan
10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.	Stakeholder Management Plan, Stakeholder Analysis Chart, and Stakeholder Register

4   RESULTS

4.1   Project Charter

In developing the Project Management Plan for the production of the ECO improved cookstoves, a Project Charter, specific objective one (1), was the first process in the Project Integration Management knowledge area. This was accomplished using interviews, meeting minutes and the PMBOK$^{®}$ Guide as sources. These were then used as the decision-making drivers together with the application of the analytical research methodology. A template from the PMI database was used as a tool to develop the Project Charter that formally authorized the project and provided the Project Manager with the authority to apply organizational resources to the project to produce the Project Management Plan. The Project Charter consisted of the project's purpose, objectives, description, high level risks, stakeholder list, high-level requirements, assumptions and contraints, identification of deliverables, a summary milestone schedule, overall project budget, criteria necessary for project approval, the identification of the project manager, and the sponsor's authorization. (Project Management Institute, 2017). Refer to Annex 1 for the detailed Project Charter for ECO ICS.

4.2   Scope Management Plan

4.2.1 Scope Management Introduction

Scope Management is a collection of processes, which ensure that the project includes all the work required to complete it while excluding all the work that is not necessary to complete it. The Scope Management Plan details how the project scope will be defined, developed, and verified. It clearly defines who is responsible for managing the projects' scope and acts as a guide for managing and controlling the scope.

Project Scope Management follows a five-step process: collect requirements, define scope, create WBS, verify scope, and control scope. Each step is explained below.

1.   Collect Requirements: this first step is the process by which we define and document the requirements needed to meet all project objectives.   The foundation of this process is the project charter and stakeholder register. Subsequently, the team can identify requirements, discuss collectively details associated with meeting each requirement, conduct interviews and follow-on discussion to clarify the requirements, and document the requirements in sufficient detail to measure them once the project begins the execution phase. This documentation also serves as an input to the next step in the process which is to define scope.

2.   Define Scope: this step is critical to project success as it requires the development of a detailed project or product description to include deliverables, assumptions, and constraints and establishes the framework in which project work must be performed.

3.   Create WBS: this process breaks project deliverables down into progressively smaller and more manageable components which, at the lowest level, are called work packages.   This hierarchical structure allows for more simplicity in scheduling, costing, monitoring, and controlling the project.

4.   Verify Scope: this is the process by which the project team receives a formalized acceptance of all deliverables with the sponsor or customer.

5.   Control Scope: this is the process of monitoring or controlling the project or product scope as well as managing any changes in the scope baseline. Changes

may be necessary to the project scope but it is imperative because they are controlled and integrated in order to prevent scope creep and gold plating.

4.2.2 Scope Management Approach

The purpose of this scope management plan is to set forth the plans and procedures for defining, developing, monitoring, controlling, changing, implementing, and verifying the project scope. It is the intent of scope management to ensure the completion of all the work required (and only the work required) to complete the project successfully.

The scope for this project is defined by the scope statement, Work Breakdown Structure (WBS) and WBS Dictionary. The Project Manager, Sponsor and Stakeholders will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements. Proposed scope changes may be initiated by the Project Manager, stakeholders, or any member of the project team. All change requests will be submitted as change orders to the Project Manager who will then evaluate the requested scope change. Upon acceptance of the scope change request, the Project Manager will submit the scope change request to the Sponsor, Stakeholder, Sub Consultants, or Subcontractors. The Project Manager is responsible for the approval of scope changes that are strictly technical in nature, whereas the Project Sponsor is responsible for the approval of scope changes affecting time and costs parameters. Upon approval of scope changes, the Project Manager will update all project documents and communicate the scope changes to all stakeholders. Based on feedback and input from the Project Manager and Stakeholders, the Project Sponsor is responsible for the acceptance of the final project deliverables and project scope.

4.2.3 Roles and Responsibilities

The project manager will assume overall responsibility for project scope management. The people listed below will assume the following scope management responsibilities:

Table 11: Roles & Responsibilities [Source: C. Kabiswa, Author August 2019]

Name	Roles	Responsibilities
Charles Kabiswa	Project Manager	a. Measure and verify project scope. b. Facilitate scope change requests. c. Facilitate impact assessments of scope change requests. d. Organize and facilitate scheduled change control meetings. e. Communicate outcomes of scope change requests. f. Update project documents upon approval of all scope changes.
Bread for the World (BfW)	Project Sponsor	a. Approve or deny scope change requests as appropriate. b. Evaluate need for scope change requests. c. Accept project deliverables.
Improved Cook Stoves for East Africa (ICSEA) UN Auditor Stove sellers, technicians and distributors	Project Team Members	a. Participate in defining change resolutions. b. Evaluate the need for scope changes and communicate them to the project manager as necessary.
Buyers of the carbon credits End users (villagers) Community-based organisations (CBOs)	Stakeholders & End users	a. Can propose scope changes b. Will execute change directives issued by Project Manager

4.2.4 Scope Definition

The scope for this project was defined through a comprehensive requirements collection process. First, a full assessment/study of the project was conducted to collect baseline data regarding the state of using "Improved Cook Stoves" as CDM, Voluntary or other Standards with a view to facilitate rapid but systematic scaling up ECO's Improved Cook Stoves in selected regions of Uganda. The Scope and tasks for the study with the supervision ECO Uganda, the funders, and the technical agency, the following are the tasks: Identify, and map out the key national actors in the landscape of Improved Cook Stoves projects and beneficiaries including cookstove and fuel manufacturers, distributors, testing organizations, researchers, local implementing partners, consultants, project developers, multilateral institutions, investors, and other relevant

stakeholder entities; Undertake a detailed assessment, and prepare a checklist, of the national requirements for CDM, Voluntary or other Standards and projects with special reference to improved cookstoves; Collect current data and information in cooking energy supply and demand situation; Estimate percent woody biomass that comes from Non-Renewable Biomass (NRB) resource base; Undertake a systematic and detailed assessment of community-based organizations and local based institutions, that are involved in cook stove production and marketing with regard to their capacity and willingness to participate in ECO's Improved Cook Stoves project: including but not limited to: Stoves manufactured; Stoves tested; Stoves disseminated; Accessibility, affordability willingness to pay, and acceptable price for ICS and; General conditions of private business sector on energy saving stoves in general. Furthermore, propose a strategy and business model to support the adoption for the "ECO's Improved Cook Stoves Project"; Identify regions and districts where ECO will initiate or work with existing projects developers to scale up and where possible adopt "ECO's Improved Cook Stoves Project" stoves or modify them to suit the area and; Identify and detail the pre-registration activities and requirements especially the ones for "Prior consideration of the clean development mechanism". To select and design the project stove the following aspects were considered: locally available materials, fuel type use, cooking patterns, taste preferences and local beliefs. Each stove model included in the project activity went through a rigorous design process prior to its final certification. The project team carried out the background research, developed a prototype to carry out the field and underwent laboratory testing followed by the design iteration based on the feedback collected and also an exhaustive cadence of meetings with the stakeholders were held. From the information gathered, the project manager developed the requirements management plan and requirements documentation.

The project deliverables were generated based on the requirements collection process and input from subject matter experts such as the Improved Cook Stoves for East Africa (ICSEA) UN Auditor, technicians, project sponsor, among others. This process of expert judgement provided feedback on the most effective, safe, and cost-efficient ways to meet the original requirements of the project.

4.2.5 Project Scope Statement

The project scope statement details the project's deliverables and the necessary work to create these deliverables.

4.2.5.1 Product Deliverables and Acceptance Criteria

The success of this project will be measured by the following criteria:

1. ECO Improve Cookstoves of both Charcoal and wood burning stove liners and meets the *Clean Development Mechanism (*CDM)'s 20% minimum thermal efficiency requirements.
2. All the stoves have two burners and are built in the household.
3. On average, each family reduces around 2.5 ton CO_2/year and saves around 40% in fuel.
4. Over the period of 4 years the stove has improved the lives of approximately 15,000 people expected to generate 192,024 carbon credits.

4.2.5.2 Project Constraints

1. The scope may change as the project progresses.
2. Not enough expert judgment available to provide expert guidance.
3. Not enough time and resources available to complete a detailed budget
4. Stakeholders' requirements may change as well as their level of interest.
5. Some roles and responsibilities may not be identified and someone not assigned to own those roles and responsibilities.
6. Some communication methods may not be available
7. Some risks may occur because of other constraints
8. The list of suppliers may not be exhaustive and some suppliers may not have the required goods available locally
9. Stakeholder requirements and level of interest may change during the project

4.2.5.3 Project Assumptions

Assumptions will include:

1. Households within Lake Victoria Basin are positive to adopt better cooking practices
2. The project scope will be defined and will identify all the work required.
3. The time allocated for the development of the Project Management Plan and the production of ECO Improved cookstoves is realistic and sufficient.
4. The budget developed during planning will accurately depict the financial resources required for production and distribution of ECO improved cookstoves
5. The quality management plan will identify all of the technical and managerial quality requirements of the project.
6. The organization has sufficient human resource
7. complete the project.
   The team development plans for the project team and subcontractors will be sufficient to begin the production of the ECO ICS production on time.
8. All line of command and authority will be documented.
9. All risk will be appropriately budgeted for
10. All goods and services will be procured and the pre-qualified list of suppliers available

4.2.6 Work Breakdown Structure

The Work Breakdown Structure (WBS) and Work Breakdown Structure Dictionary are key elements to effective scope management. This section should discuss how the project scope is subdivided into smaller deliverables in the WBS and WBS Dictionary and how these smaller components are managed during the life of the project.

In order to define the necessary work for project completion, WBS Dictionary was used. The WBS Dictionary includes an entry for each WBS element. The WBS Dictionary includes a detailed description of work for each element and the deliverables, budget, and resource needs for that element (Figure 18).

Figure 21 WBS [Chart View] [Source: C. Kabiswa, Author, August 2019]
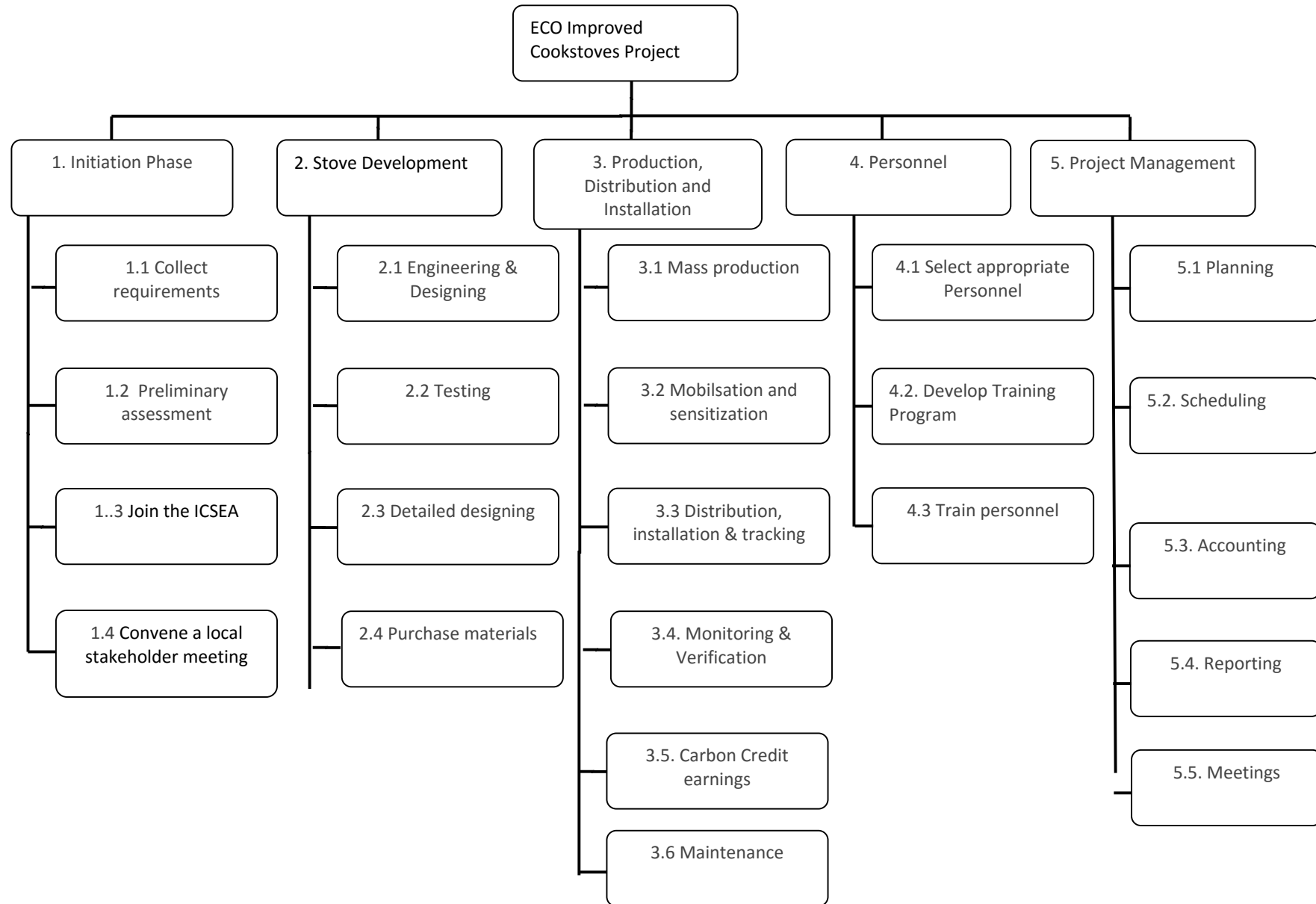
Table 12: WBS Dictionary [Source: C. Kabiswa, Author, August 2019]

WBS ID	Task Name	Description of Work	Deliverables	Budget ($)	Resources
1.1	Initiation Phase	Request for proposal		51,800.00	
1.1.1	Collect requirements	Meet with project key stakeholders to gather project's needs.	Initial requirements documentation	2,500.00	
1.1.2	Improve Cookstoves preliminary assessment	Will perform assessment of the project to collect baseline data, identify and map out key stakeholders	ECO ICS project assessment report	5,300.00	
1.1.3	Join the improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA) for CDM/Gold Standard/Fairtrade carbon credits	Submit all the required documents to ICSEA for its inclusion in the acclaimed Improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA).	Member of the ICSEA PoA which will enable its beneficiary households to generate and acquire valuable CDM/Gold Standard/Fairtrade carbon credits, for which there is a ready market at attractive prices.	23,000.00	ICSEA Composite fees
1.1.4	Convene a local stakeholder consultative (LSC)	To providing a national input into the design of ECO Improved cook stoves enterprise as a requirement by Gold Standard Activity/ Clean Development Mechanism (CDM) Component Project Activity (CPA).	A Local Stakeholder Consultation (LSC) meeting held	21,000.00	
1.2	Stove Development	Phase where all changes in the production of improved stoves are planned and executed.		399,100.00	
1.2.1	Engineering and Designing	Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests	A stove model designed	22,500.00	

WBS ID	Task Name	Description of Work	Deliverables	Budget ($)	Resources
1.2.2	Testing	Carry out the efficiency and field test with a minimum of 50 stoves. During the initial testing phase, the project team gathers feedback from users especially on cooking patterns, taste preferences and local beliefs. This includes testing for thermal efficiency	Stove model tested for on cooking patterns, taste preferences and local beliefs and for thermal efficiency	15,000.00	Sub-contractor quote
1.2.3	Detailed designing	Submit all changes required in facilities to execute all the required changes. Each stove model included in the project activity go through a rigorous design process prior to its final certification. This includes the field and and laboratory testing followed by the design iteration based on the feedback collected.	Final design of stove model with consideration of feedback and testing recommendations	15,600.00	CS quote
1.2.4	Procurement of materials	Executing required purchases to support production of stoves	Materials and inputs purchase orders	346,000.00	Suppliers Quotes
1.3	Production, Distribution and Installation	Production, distribution and installation of efficient stoves to individual households to replace traditional cookstoves		1,220,000.00	
1.3.1	Mass production of stoves	Production of stoves that pass both quality assurance test on performance and durability as well as consumer preference and acceptability tests	Final product of stoves produced	826,000.00	
1.3.2	Mobilisation and sensitisation of	ECO will create awareness among target customers/households regarding	Community awareness and promotional strategies	106,000.00	

WBS ID	Task Name	Description of Work	Deliverables	Budget ($)	Resources
	the community	improved stoves and will simultaneously promote itself by using different innovating marketing tools such as community music and drama groups.	used to change their attitude and perceptions		
1.3.3	Distribution, installation & tracking in the households	Works related to assemble the equipment and connecting all the facilities.	ICS installed in households to replace inefficient Traditional Cook Stoves (TCS)	152,000.00	
1.3.4	Monitoring & Verification	Includes tracking and monitoring of cookstove distribution and use as well as *carbon monitoring and certification*	Project monitoring and verification conducted	85,000.00	
1.3.5	Carbon Credit Earnings	Long-term sustainability is completely contingent on securing buyers of carbon credits. Carbon monitoring guarantee a long-term contact and feedback from beneficiaries.	An income generating opportunity from the sale of the carbon credits		
1.3.5	Stove maintenance	Routine stove checking and requests for maintenance will be done by the carbon credit income as a way of ensuring that the stoves maintain their thermal efficiency and tracking of the usage of the stoves	**4.6 Annual stove maintenance report**	51,000.00	
1.4	Personnel	The project will hire, train dedicated staff to ensure that it takes off effectively and is a long-term success.	Project dedicated staff hired and trained	230,000.00	
1.4.1	Hire appropriate personnel	Headcount allocation to manage the project.	Personnel list	123,000.00	Staff contract

WBS ID	Task Name	Description of Work	Deliverables	Budget ($)	Resources
1.4.2	Develop training programs	Works related to develop a training program.	Training material and schedule	32,000.00	Training Manual
1.4.3	Train personnel	Training execution to chosen personnel.	Training completion email	75,000.00	Sub-contract quote
1.5	Project Management	The management of the planning, execution, monitoring and controlling, and closure of the project.		NA	
1.5.1	Planning	Planning and updating project activities throughout project lifecycle.	Project Management Plan	NA	
1.5.2	Scheduling	Planning of project activities, assigning timeline and dates to determine, and control project duration.	Schedule - Gantt	NA	
1.5.3	Accounting	Monitoring the financial expenditures of the project throughout the project lifecycle.	Financial Report	NA	
1.5.4	Reporting	Documenting project activities, preparing reports and presenting to the appropriate stakeholders.	Project progress reports	NA	
1.5.5	Meetings	All meetings held to control the management of the project.	Progress meetings	NA	

4.2.6.1 Scope Verification

The deliverables will be verified against the original scope by the Project Manager and will be approved by the Project Sponsor. Progress report meetings are one of the channels that will be used. The formal acceptance must be documented and distributed through email among the key stakeholders' distribution list. This will ensure that project work remains within the scope of the project on a consistent basis throughout the life cycle of the project.

4.2.2 Scope Control

The Project Manager and project team will ensure that the WBS Dictionary will be used as a statement of work for each WBS element. The project team will ensure that they perform only the work described in the WBS Dictionary and generate the defined deliverables for each WBS element.

When a scope change is required, the process for submitting changes should be redirected to the Project Manager in the form of a project change order. The Project Manager will then review the suggested change to the scope of the project. The Project Manager will either deny the change request if it does not apply to the intent of the project or convene a change control meeting between the project team and Sponsor to review the change request further and perform an impact assessment of the change. If the change request receives approval by the Project Manager and Sponsor, the Project Manager will then formally submit the change request to the Project Sponsor who will formally accept the change by signing the change order. Upon acceptance of the scope change by the Project Manager and Project Sponsor, the Project Manager will update all project documents and communicate the scope directive to all project team members and stakeholders.

4.2.3 Sponsor Acceptance

Approved by the Project Sponsor:

_____   Date: _____

<Project Sponsor>

<Project Sponsor Title>

Revision History

Version	Date	Reason	Executive Sponsor Sign Off

4.3   Schedule Management Plan

4.3.1 Schedule Management Introduction

The schedule management plan describes how the project schedule will be established and managed. The project schedule is the guide to how the project will be completed and finished. The schedule management plan is used to define the technique the project team will use in creating the project schedule. This plan also comprises how the team will review the project schedule and manage changes after the standard schedule has been approved. This includes identifying, analyzing, documenting, prioritizing, approving or rejecting, and publishing all schedule related changes.

4.3.2 Schedule Management Approach

Project schedules will be made using Microsoft Project 2013. Activity definition will identify the specific work packages which must be performed to complete each deliverable. Activity sequencing will be used to determine the order of work packages and assign relationships between project activities. Moreover, activity duration estimating will be used to calculate the number of work periods required to

complete work packages. Finally, resource estimating will be used to assign resources to work packages in order to complete schedule development.

Once an initial schedule has been developed, the project manager and assistant project manager will assess it cautiously to review assigned project tasks. The project team and resources must agree on the proposed work package assignments, durations, and schedule. Once this is achieved, the project sponsor will review and approve the schedule and it will be baselined.

4.3.3 Activities Definition, Sequence and Duration

Based on the WBS previously developed, a list of activities was defined in alignment to the three-month period expected to execute the project. This provided a basis for the timely estimation, sequencing, production, monitoring, and evaluation of project work. In addition, the interaction between project activities was specified, relationships were identified, documented, and logically sequenced.

Table 13: Project Activities [Source: C. Kabiswa, August 2019]

WBS	Task Name	Description of Work	Duration	Predecessors
1.1	Initiation Phase	Request for proposal	60days	10
1.1.1	Collect requirements	Meet with project key stakeholders to gather project's needs.	20days	
1.1.2	Conduct cookstoves preliminary assessment	Will perform assessment of the project to collect baseline data, identify and map out key stakeholders	50days	
1.1.3	Join the improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA) for CDM/Gold Standard/Fairtrade carbon credits	Submit all the required documents to ICSEA for its inclusion in the acclaimed Improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA).	20days	
1.1.4	Convene a local stakeholder consultative (LSC)	To providing a national input into the design of ECO Improved cook stoves enterprise as a requirement by Gold Standard	3 days	

WBS	Task Name	Description of Work	Duration	Predecessors
		Activity/ Clean Development Mechanism (CDM) Component Project Activity (CPA).		
1.2	Stove Development	Phase where all changes in the production of improved stoves are planned and executed.	120days	20
1.2.1	Engineering and Designing	Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests	60days	
1.2.2	Testing	Carry out the efficiency and field test with a minimum of 50 stoves. During the initial testing phase, the project team gathers feedback from users especially on cooking patterns, taste preferences and local beliefs. This includes testing for thermal efficiency	15days	
1.2.3	Detailed designing	Submit all changes required in facilities to execute all the required changes. Each stove model included in the project activity go through a rigorous design process prior to its final certification. This includes the field and and laboratory testing followed by the design iteration based on the feedback collected.	60days	
1.2.4	Procurement of materials	Executing required purchases to support production of stoves	20days	
1.3	Production, Distribution and Installation	Production, distribution and installation of efficient stoves to individual hhs to replace traditional cookstoves	900days	40
1.3.1	Mass production of stoves	Production of stoves that pass both quality assurance test on performance and durability as	100days	

WBS	Task Name	Description of Work	Duration	Predecessors
		well as consumer preference and acceptability tests		
1.3.2	Mobilisation and sensitisation of the community	ECO will create awareness among target customers/households regarding improved stoves and will simultaneously promote itself by using different innovating marketing tools such as community music and drama groups.	360days	
1.3.3	Distribution, installation & tracking in the households	Includes distribution and installing stoves to household and tracking their use	600days	
1.3.4	Monitoring & Verification	Includes monitoring of cookstove distribution and use as well as *carbon monitoring and certification*	720days	
1.3.5	Carbon Credit Earnings	Long-term sustainability is completely contingent on securing buyers of carbon credits. Carbon monitoring guarantee a long term contact and feedback from beneficiaries.	720days	
1.3.5	Stove maintenance	Routine stove checking and requests for maintenance will be done by the carbon credit income as a way of ensuring that the stoves maintain their thermal efficiency and tracking of the usage of the stoves	100 days	
1.4	Personnel	The project will hire, train dedicated staff to ensure that it takes off effectively and is a long-term success.	1000days	30
1.4.1	Hire appropriate personnel	Headcount allocation to manage the project.	30days	
1.4.2	Develop training programs	Works related to develop a training program.	20days	

WBS	Task Name	Description of Work	Duration	Predecessors
1.4.3	Train personnel	Training execution to chosen personnel.	30days	
1.5	Project Management	The management of the planning, execution, monitoring and controlling, and closure of the project.	1000days	30
1.5.1	Planning	Planning and updating project activities throughout project lifecycle.	300days	
1.5.2	Scheduling	Planning of project activities, assigning timeline and dates to determine, and control project duration.	100days	
1.5.3	Accounting	Monitoring the financial expenditures of the project throughout the project lifecycle.	300days	
1.5.4	Reporting	Documenting project activities, preparing reports and presenting to the appropriate stakeholders.	300days	
1.5.5	Meetings	All meetings held to control the management of the project.	200Days	

4.3.4 Develop Schedule

In this section, all prior time management processes will be integrated to reflect ECO ICS project schedule. The sequenced activity list and duration estimated will be approved for the timely execution of project tasks over time.

4.4   Cost Management Plan

4.4.1 Process Description and Importance

The cost management plan is the only output of the first process of cost management "Plan Cost Management". It describes how the project costs will be planned, structured, and controlled by establishing the policies, procedures, and documentation for planning, managing, expending, and controlling projects costs. The main advantage of this process is that it provides guidance and direction on how the project costs will be managed throughout the project. The good management of the cost of a project is directly related to the project success. Thus,

one of the most important responsibilities presented to the Project Manager is to know how to adequately estimate costs to complete satisfactorily the project and please the interested parties. In order to have a successful cost management plan, it is imperative to following these requirements:

- Define specific units of measure for each resource.
- Establish the level of precision and accuracy of cost estimates.
- Create organizational procedures links with the organization.
- Define control thresholds to monitor cost performance.
- Establish the rules for the performance measurement through the earned value management (EVM).
- Report the formats and frequency of submission of reports.
- Document the process descriptions.
- Describe additional details about cost management.

4.4.2 Tools and Techniques to be used on the cost management plan

After the scope of the ECO ICS project have been determined, the project team will finalize the resource and staffing requirements necessary for the successful completion of the project. The Project Manager will create the Work Breakdown Structure (WBS) of the Project using group decision making techniques with the engagement of all stakeholders with a very high level of power. Expert judgment will play a key role in establishing costs for activities. Costs will be easily estimated with the use of historical information, discipline specific tools, and activity guidelines. From this input, costs associated with labor, materials or resources needed, and planned durations of each WBS element, will be estimated and then aggregated to establish the cost of each work package.

A third point estimating approach using PERT analysis will be taken into account by using spreadsheets with formulas to compute expected costs, contingency reserves, and their translated monetary values to identify the costs of the known risks. Custom fields such as activity, sequence, duration, expected cost, contingency reserve, and expected monetary value will also be used. A vendor bid analysis will be used for the supplies needed in the rodent control activities, road

repairs, garbage receptacles, among others. Using the best information available at the time of estimation, a cost management plan will be prepared.

4.4.3 Activity Costs Estimates

Activity cost estimates is an estimation of what the activity will cost upon completion based on information known to date and is one of the outputs of the second process of project cost management, according to the PMBOK Guide (6th edition) classification. Cost estimates are a prediction that is based on the information known at a given point in time. They should be reviewed and refined during the course of the project to reflect additional detail as it becomes available and assumptions are tested. The accuracy of a project estimate will increase as the project progresses through the project life cycle. The benefit of this process is that it determines the amount of cost required to complete project work.

This process presents ten tools and techniques for aiding with the cost estimates, namely expert judgment, analogous estimating, parametric estimating, bottom-up estimating, reserve analysis, cost of quality (COC), project management software, group decision-making techniques, vendor bid analysis, and three-point estimating. The latest one, three-point estimating, has been the technique chosen by this team due to its advantages over the other options. Three-point estimating improves the accuracy of the estimates of the costs of a single activity if they have uncertainty. It also takes into account risks; thus, estimates are used for three values to define an approximate range of the cost of the activity. This is done as follows:

- Most likely (cM): The cost of the activity is based on realistic effort assessment for the required work and any projected expenses.
- Optimist (cO): The activity cost is based on analysis on the best-case scenario for the activity.
- Pessimist (cP): The activity cost is based on analysis of the worst-case scenario for the activity.

From these values, the expected cost (cE) is then calculated using the following formulas:

- Triangular distribution: $cE = (Co+Cm+Cp)/3$ or
- Beta distribution (from PERT analysis): $Ce = (cO+4cM+cP)/6$

The estimation of costs through this tool (using a given distribution) clears the degree of uncertainty about the expected cost.

Table 14: Activities Cost Estimate [Source: C. Kabiswa, August 2019]

WBS	Task Name	Description of Work	Most likely (cM) $	Optimistic (cO) $	Pessimistic (cP) $	Expected Cost (cE)
1.1	**Initiation Phase**	**Request for proposal**	51,800.00	47,000.00	59,600.00	52,800.00
1.1.1	Collect requirements	Meet with project key stakeholders to gather project's needs.	2,500.00	2,000.00	2,700.00	2,400.00
1.1.2	Improve Cookstoves preliminary assessment	Will perform assessment of the project to collect baseline data, identify and map out key stakeholders	5,300.00	5,000.00	5,900.00	5,400.00
1.1.3	Join the ICSEA PoA for CDM/Gold Standard/Fairtrade carbon credits	Submit all the required documents to ICSEA for its inclusion in the acclaimed Improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA).	23,000.00	20,000.00	26,000.00	23,000.00
1.1.4	Convene a local stakeholder consultative (LSC)	To providing a national input into the design of ECO Improved cook stoves enterprise as a requirement by Gold Standard Activity/ Clean Development Mechanism (CDM) Component Project Activity (CPA).	21,000.00	20,000.00	25,000.00	22,000.00
1.2	**Stove Development**	**Phase where all changes in the production of improved stoves are planned and executed.**	399,100.00	405,000.00	484,100.00	429,400.00
1.2.1	Engineering and Designing	Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests	22,500.00	25,000.00	26,600.00	24,700.00
1.2.2	Testing	Carry out the efficiency and field test with a minimum of 50 stoves. During the initial testing phase, the project team gathers feedback from users especially on	15,000.00	15,000.00	15,600.00	15,200.00

WBS	Task Name	Description of Work	Most likely (cM) $	Optimistic (cO) $	Pessimistic (cP) $	Expected Cost (cE)
		cooking patterns, taste preferences and local beliefs. This includes testing for thermal efficiency				
1.2.3	Detailed designing	Submit all changes required in facilities to execute all the required changes. Each stove model included in the project activity go through a rigorous design process prior to its final certification. This includes the field and and laboratory testing followed by the design iteration based on the feedback collected.	15,600.00	15,000.00	15,900.00	15,500.00
1.2.4	Procurement of materials	Executing required purchases to support production of stoves	346,000.00	350,000.00	426,000.00	374,000.00
1.3	**Production, Distribution and Installation**	**Production, distribution and installation of efficient stoves to individual hhs to replace traditional cookstoves**	1,220,000.00	1,240,000.00	1,323,000.00	1,261,000.00
1.3.1	Mass production of stoves	Production of stoves that pass both quality assurance test on performance and durability as well as consumer preference and acceptability tests	826,000.00	850,000.00	895,000.00	857,000.00
1.3.2	Mobilisation and sensitisation of the community	ECO will create awareness among target customers/households regarding improved stoves and will simultaneously promote itself by using different innovating marketing tools such as community music and drama groups.	106,000.00	100,000.00	124,000.00	110,000.00

WBS	Task Name	Description of Work	Most likely (cM) $	Optimistic (cO) $	Pessimistic (cP) $	Expected Cost (cE)
1.3.3	Distribution, installation & tracking in the households	Works related to assemble the equipment and connecting all the facilities.	152,000.00	150,000.00	157,000.00	153,000.00
1.3.4	Monitoring & Verification	Includes tracking and monitoring of cookstove distribution and use as well as *carbon monitoring and certification*	85,000.00	90,000.00	92,000.00	89,000.00
1.3.5	Carbon Credit Earnings	Long-term sustainability is completely contingent on securing buyers of carbon credits. Carbon monitoring guarantee a long term contact and feedback from beneficiaries.		N/A		N/A
1.3.5	Stove maintenance	Routine stove checking and requests for maintenance will be done by the carbon credit income as a way of ensuring that the stoves maintain their thermal efficiency and tracking of the usage of the stoves	51,000.00	50,000.00	55,000.00	52,000.00
1.4	**Personnel**	**The project will hire, train dedicated staff to ensure that it takes off effectively and is a long-term success.**	230,000.00	230,000.00	245,000.00	235,000.00
1.4.1	Hire appropriate personnel	Headcount allocation to manage the project.	123,000.00	120,000.00	132,000.00	125,000.00
1.4.2	Develop training programs	Works related to develop a training program.	32,000.00	35,000.00	38,000.00	35,000.00
1.4.3	Train personnel	Training execution to chosen personnel.	75,000.00	75,000.00	75,000.00	75,000.00
1.5	**Project Management**	**The management of the planning, execution, monitoring and controlling, and closure of the project.**	$ -	$ -	$ -	$ -
1.5.1	Planning	Planning and updating project activities throughout project lifecycle.		NA		N/A

WBS	Task Name	Description of Work	Most likely (cM) $	Optimistic (cO) $	Pessimistic (cP) $	Expected Cost (cE)
1.5.2	Scheduling	Planning of project activities, assigning timeline and dates to determine, and control project duration.		NA		N/A
1.5.3	Accounting	Monitoring the financial expenditures of the project throughout the project lifecycle.		NA		N/A
1.5.4	Reporting	Documenting project activities, preparing reports and presenting to the appropriate stakeholders.		NA		N/A
1.5.5	Meetings	All meetings held to control the management of the project.		NA		N/A

4.4.4 Project Budget

Determine Budget is the third process of this Knowledge Area where the estimated cost of individual activities or tasks is summed up to draw the cost baseline. The cost baseline of the budget includes all the authorized funds that are essential for project execution. It is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline. A project budget includes all the funds authorized to execute the project. The main advantage is that it determines the cost baseline against which project performance can be monitored and controlled.

This process presents the following five tools and techniques:

- Cost aggregation (The cost estimates are added according to the WBS work packages.)
- Data/Reserve analysis (Both for contingency reserve and for project management.)
- Expert judgement (Experience.)

- Historical information/relationships review (Development of simple or complex models from parametric or analogous estimates based on any historical relationship.)
- Funding limit reconciliation (Knowledge of the expenditure of funds based on the funding limits set.)

One of the outputs of this process is the cost baseline, which is the approved version of the project budget excluding any management reserve. This cost baseline can only be changed through formal change control procedures. It is used as a basis for comparison with the actual results and it is developed as the sum of the approved budgets for the different activities of the schedule. The baseline of the project is the one that marks the scope, the time, the costs, and the milestones to reach within a project. It could be said that it is the basis for the development of the project and its subsequent control. The cost baseline allows identifying the parts of the project where major deviations have occurred so that corrective actions can be taken. The results can be included in the generation of a knowledge base that can be used in future projects with the same characteristics.

Table 15: Budget Chart [Source: C. Kabiswa, August 2019]

Code	Activity	Expected Cost	Contingency Reserve
1.1	Initiation Phase	$ 52,800.00	$ 7,920.00
1.2	Stove Development	$ 429,400.00	$ 64,410.00
1.3	Production, Distribution and Installation	$ 1,261,000.00	$189,150.00
1.4	Personnel	$ 235,000.00	$ 35,250.00
1.5	Project Management	$ -	$ -
	Total	**$ 1,978,200.00**	**$296,730.00**
	Cost Baseline	$	
	Management Reserve (7%)	$ 138,474.00	$ 20,771.10
	Budget	**$ 2,116,674.00**	**$317,501.10**

The general purpose of reserves in projects is to provide a cushion against surprise both the expected (contingency reserve) and the unexpected (management reserve). Historical information (even from expert judgment) about similar successful community improvement projects, was used to allocate the percentages for each reserve in the project. The contingency reserves were calculated per major work package with each work package being allocated to a different percentage ranging from 3-5% based on the level of risk, uncertainty, and potential impact associated with that work package. The work package which would cause the most burdensome impact was "personnel" and thus was given the highest percentage (5%); followed by "equipment and facility" with 3% being assigned.

4.4.5 Control costs

The final process of the PMBOK (6th edition) classification for the project cost management is the control costs, which is primarily concerned with the measurement of variances of the actual costs from the proposed baseline. This process is responsible for monitoring the level of execution of the project budget and controlling changes in the baseline of cost performance. The cost control of the project deals with the following aspects:

- Influence the factors that produce changes in the cost baseline.
- Ensure that cost change requests are approved.
- Manage cost changes as they occur.
- Ensure that potential surcharges do not exceed the funding restrictions authorized for the project both total and for periods.
- Monitor cost performance to detect and understand variations with respect to the cost baseline.
- Record accurately and pertinently the changes in the cost baseline.
- Avoid improper, inappropriate, or unapproved changes in cost or resource use.
- Report approved changes to relevant stakeholders.

- Ensure maintenance of the expected surcharges within acceptable limits.

The key benefit of this process is that it provides the means to detect deviations from the plan in order to take corrective action and minimize risk. The tools or techniques of this process include:

- Earned value management (EVM): (performance measurement, integrates project scope measurements, cost and schedule)

Table 16: Performance measurement [Source: C. Kabiswa, August 2019]

Planned Value (PV)	It is the authorized budget planned for the work to be accomplished for an activity or WBS component. As of today, what is the estimate value of the work planned to be done?		
Earned Value (EV)	It is a measure of schedule performance expressed in terms of the budget authorized for that work. As of today, what is the estimated value of the work actually accomplished?		
Actual Cost/Total cost (AC)	It is the realized cost incurred for the work performed on an activity during a specific time period. As of today, what is the actual cost incurred for the work accomplished?		
Schedule Variance (SV)	SV=EV-PV	SV<0	There is a delay in planning
		SV>0	There is no delay in programming
Cost Variance (CV)	CV=EV-AC	CV<0	The budget has been exceeded
		CV>0	Budget is being respected
Schedule Performance Index (SPI)	SPI=EV/PV	SPI<1	Inefficiency in the use of time
		SPI>1	Efficiency in the use of the time
Cost Performance Index (CPI)	CPI=EV/AC	CPI<1	Inefficiency in the use of resources
		CPI>1	Efficiency in the use of resources

Schedule Performance Index (SPI)	$SPI = EV / PV$ EV = earned value PV = planned value	< 1 behind schedule = 1 on schedule > 1 ahead of schedule
Cost Performance Index (CPI)	$CPI = EV / AC$ EV = earned value AC = actual cost	< 1 Over budget = 1 On budget > 1 Under budget
Schedule Variance (SV)	$SV = EV - PV$ EV = earned value PV = planned value	< 0 Behind schedule = 0 On schedule > 0 Ahead of schedule
Cost Variance (CV)	$CV = EV - AC$ EV = earned value AC = actual cost	< 0 Over budget = 0 On budget > 0 Within budget

To-Complete Performance Index (TCPI)	$TCPI = (BAC - EV) / (BAC - AC)$ BAC = budget at completion EV = earned value AC = actual cost	< 1 Under budget = 1 On budget > 1 Over budget
Estimate to Completion	$ETC = EAC - AC$ EAC = estimate at completion AC = actual cost	
Variance at Completion	$VAC = BAC - EAC$ BAC = budget at completion EAC = estimate at completion	< 0 Under budget = 0 On budget > 0 Over budget
PERT Estimation	$(O + 4M + P)/6$ O = optimistic estimate M = most likely estimate P = pessimistic estimate	

• Forecasting: (as the project progresses, a projection of the conclusion estimate (EAC) is made).

- EAC forecast for ETC work performed at the budgeted rate: EAC=AC+(BAC-EV).

- EAC forecast for ETC work performed at present CPI: EAC=BAC/CPI.
- EAC forecast for ETC work considering both SPI and CPI factors: EAC=AC+((BAC-EV) / (CPI x SPI)).

• To-complete performance index (TCPI): (Estimating how much expenditure needs to be adjusted to meet the project budget).

• Performance reviews: (comparison of actual project work performance with baseline schedule and baseline costs).

- Variance analysis: It is the explanation (cause, impact, and corrective actions) for cost (CV=EV-AC), schedule (SV=EV-PV), and variance at completion variances (VAC=BAC-EAC).
- Trend analysis.
- Earned value performance.

• Project management software.

• Reserve analysis.

The Project Manager will be responsible for managing and reporting on the project's cost throughout the duration of the project. Project status meetings will be held montly as well as updates given on project expenditures and cost deviations. As the project progresses, the costs incurred will be matched against baseline costs established using the WBS developed. Expenditures will be monitored using planned value, earned value, and actual cost on a monthly basis. This earned value management approach will be used to combine scope, schedule, and cost measurements to assess the project performance and progress at a given date. Earned value will be used to calculate cost variances that will determine whether the project is over budget or under budget. Cost variance (CV) will be calculated by deducting the actual costs from the earned value. The appropriate action(s) will be taken based on the extent of the variance:

- Positive cost variance (>0) – (the project work is costing less than planned in the budget) - In the event that this occurs, there will be an examination of activities and associated costs to determine if there were any overestimations.

Secondly, the Project Manager will continue monitoring activities, taking advantage of less expensive options, and minimizing costs where necessary.

- Negative cost variance (<0) – (the project work is costing more than planned in the budget) – In the event that this occurs, there will be an examination of activities and associated costs to determine if there were any underestimations. Adjustments would have to be made accordingly. The Project Manager will also have to identify any events or circumstances that arose and in effect increased costs, in which case risk management strategies would have to be employed. As an added measure, CV can be calculated for each work package for better monitoring and control.

- Neutral Cost Variance (=0) – (expenses as planned in the budget) – If there is zero variance, then the Project Manager will continue to monitor project budget expenditure and activities to keep project on schedule as planned.

Performance reviews done quarterly will also entail:

- Updating the schedule and actual costs associated with the current progress.
- Inspections of work done and matching with the budget.
- Communicating project progress and budget updates to stakeholders

4.4.6 Cost Change Management

The cost change management process describes how changes are submitted, approved, and tracked. According to the PMBOK (6th edition), change requests may include preventive or corrective actions and are processed for review and disposition through the perform integrated change control process. Requests for budget changes are usually submitted by the project manager and approvals for project cost changes routed through the project sponsors. The cost change management processes include the following:

- Assessment of change identified using cost variance analysis.
- Completion of change request form.
- Review of proposed change along with documented analysis of cost change.

- Discussion among relevant stakeholders to determine approval or denial of requested changes.

- Decision for change request signed off on and documented.

- Project manager making the necessary adjustments to relevant documents (WBS, budget allocations, project schedule, among others).

Cost changes are clearly documented in the change log to aid in communication with stakeholders. The change log records all changes made to cost, scope, schedule, and quality so that changes and their resulting impact or risk can be closely tracked through a change log template.

4.5 Quality Management Plan

4.5.1 Quality Management Introduction

The quality management plan for the ECO Improved Cookstoves project will establish the activities, processes, and procedures for ensuring a quality product upon the conclusion of the project. The purpose of this plan is to:

- Ensure that quality is planned.
- Define how quality will be managed.
- Define quality assurance activities.
- Define quality control activities.
- Define acceptable quality standards.

4.5.2 Quality Assurance

In order to perform quality assurance, the following steps or actions will be performed by the project team:

1. Identify, and map out and analyse the projects of the same size in Uganda to study the main characteristics of this ones and how successful they were, in order to take advantage of the methodology used through benchmarking.

2. The definition of technical specifications. A precondition for quality assurance is the definition of the "quality" which shall be assured. Commonly, it is not the "stove quality" which is described, but rather the dimensions, properties of

materials to be used and sometimes the kind of processing technology to be applied. These details are documented in a stove fact sheet including design sketches. Test results are often complemented to prove that stoves of these specifications can achieve specific performance results under standardized conditions (e.g. water boiling test).

3. Ensure that the main stakeholders key national stakeholders in the landscape of Improved Cook Stoves projects and beneficiaries including cookstove and fuel manufacturers, distributors, testing organizations, researchers, local implementing partners, consultants, project developers, multilateral institutions, investors, and other relevant stakeholder entities; have fully understood how the ECO Improved Cookstoves project will be developed and the requirements to be met. In addition, maintaining constant communication with them throughout the entire development of the project to avoid possible misunderstandings and create a quality management plan and process improvement plan.

4. The standardization of the production processes. In order to reduce the possibility of unintended deviations of dimensions in the production process (design drift), there are possibilities to support the producers with measures and tools and measuring methods.

5. Voluntary quality labels. Project will design quality labels granted to stoves which adhere to quality specifications. The availability of the label ensures the customer that this stove has been checked and is produced according to specifications. The label later on can be handed over to an association of artisans. However, sometimes these labels are faked by other producers.

6. Find the most suitable means and the necessary resources to fulfill all the requirements of the project including a checklist of the national requirements for CDM, Voluntary or other Standards and projects with special reference to improved cookstoves; Ensure that all the permits and approvals have been obtained at least a month prior to start of the project.

7. Work in the specific time frames by providing the required documentation in order to meet the improve cook stoves registration requirements before deadlines and also so that the UN auditor can be able to visit the project site

8. Implement mechanisms and procedures for systematic verification and monitor the results periodically through internal or external quality audits, acting as soon as possible in case of detecting signs of deviations or errors in the project.

9. Improve cook stove quality, from component durability to stove model performance and consistency through a combination of standards and rigorous monitoring and supervision

10. After sale quality assurance. Quality assurance of ICS can also be promoted by the users. For this to happen, the users have to be made aware about stove quality aspects and their role. Awareness materials such as posters and leaflets, but also theater play or the training of women groups can promote the awareness of users on the important features of a good quality ICS. A warranty on stove performance or durability is a way the project can assure customers on the quality of their stove. If the stoves do not perform according to their promises, they offer after sales services to replace or improve the stove. This concept is important particularly for fixed stoves as the customer has no choice but to accept whatever is built in his/her kitchen.

4.5.3 Quality Control

In order to control quality, the project team will employ the following steps or actions:

1. Establish quality control measurements. Specific requirements will be assigned to individual members on the project team and each person will be responsible for overseeing and verifying that requirements are delivered. However, the Project Manager will provide oversight in all areas.

2. Produce frequent progress reports to verify that results are accurate and in alignment with project scope. Reports will be delivered in regular meetings.

3. Analyze the results of quality audits. Non-compliant activities identified will undergo immediate corrective or preventative action in accordance with the established integrated change control process and change logs will be updated.

4. Monitor cost and schedule performance by examining planned versus actual results. Source of variances will be identified and the necessary corrective actions will be taken.

5. Monitor and evaluate the results of corrective actions and produce quality control reports. The project team will conduct spot checks routinely for quality control.

4.5.4 Quality Management Tools

The tools to be used by the project team for quality management are:

- Quality Meeting: A quality meeting will be held at the outset to introduce the project to the team, identify and prioritize stakeholders and their requirements, and to get ideas via brainstorming in order to establish a quality management plan. Those meetings will also be held periodically to ascertain the progress of the team and, if there are any delays, determine corrective actions to be applied to get back on track.

- Flowchart: a flowchart will be used to establish the sequence of events. From these possible points of deviation (things going wrong), events will be identified and appropriate corrective measures established for said deviations will be implemented.

- Benchmarking: This will be applied whereby the team will examine past similar projects to obtain best practices for suppliers' selection, to prioritize these suppliers, and to provide the basis for measuring performance. Things to look on will be hotels and transportation companies normally used and the outcome of their services.

- Check sheets: These will be primarily used as a data collection tool to source the suppliers for the event. The who, what, when, where, how, and why of the project will be established. It will tell the responsible person (who), what should be done by that person(s), when and where it should be done, detailing how it

should be done to include specifications, assurance activity, and quality metrics, and the reason for collection (why) so that the goal is understood and team member(s) will respond appropriately in unexpected situations.

- Compliance matrix: a compliance matrix will be developed for each major stakeholder. This will include the stakeholder as the reference number, the requirements for each stakeholder, the response (what is to be done to meet each), completion date, team member(s) responsible, and the contacts for team members, stakeholders, and suppliers.

- Inspection: frequent inspections will be carried out to ensure that the project is progressing as planned. Initially, when the suppliers are finalized, project team members will visit the hotel (for example) to view the rooms and ensure that all requirements are met. A checklist will be used to note compliance with requirements. Moreover, it will be used on the day of the event inspection to ensure success and maintain the integrity of the team.

- Quality check list: In order to verify that the equipment installation is successful, a quality checklist needs to be fulfilled.

4.6   Human Resource Management Introduction

Human resource management is an important part of the ECO Improved Cookstoves. The human resource management plan is a tool which will aid in the management of this project's human resource activities throughout the project until its completion. The human resource management plan includes:

- Roles and responsibilities of team members throughout the project.
- Project organization chart.
- Staffing management plan to include how resources will be acquired.
- Project team management and development.

The purpose of the human resource management plan is to achieve project success by ensuring the appropriate human resources with the necessary skills are acquired, resources are trained if any gaps in skills are identified, team building strategies are clearly defined, and team activities are effectively managed.

4.6.2 Roles and Responsibilities

The roles and responsibilities for the ECO Improve Cookstoves project are essential to project success. All team members must clearly understand their roles and responsibilities in order to successfully perform their portion of the project. For ECO Improved Cookstoves project the following project team roles and responsibilities have been established:

Project Manager: The project coordinator was pre-assigned by the Sponsor and has experience of working on similar projects. The project manager is responsible for the overall success of the project. The PM must authorize and approve all project expenditures. The PM is also responsible for ensuring that work activities meet have established acceptability criteria and have fallen within acceptable variances. The PM will be responsible for reporting project status in accordance with the communications management plan. The PM will evaluate the performance of all project team members. The PM must possess the following skills: leadership and management, budgeting, scheduling, and effective communication.

Project Engineer: Responsible for tracking installation progress, solving technical issues, and releasing the equipment to production. The project engineer is responsible for creating the list of required spares and consumables and is in charge of sending weekly reports on the progress of the project to the PM. Responsible for auditing all the steps in the project to meet Safety and Environmental policies.

Project Development Manager will be responsible for regular contact with ICSEA Ltd on ECO's behalf. He/she will also be charged with maintaining and monitoring the Business Plan, business schedules, work hours, budgets and expenditures, plus organizing, attending and participating in stakeholder meetings and providing administrative support as needed.

The Finance and Procurement Officer will be in charge of all financial documents and transactions on behalf of ECO. Outlines the characteristics of the shipping process; this includes shipping timeframe and estimating logistics costs.

Field and Service officers will support the project on a 100% level of effort and will be responsible for mobilizing communities to buy and use the stoves. Besides promoting the business, the field and service staff will track the use of the stoves and provide or organize the free annual maintenance of stoves to ensure their continued use. The field and Service officers will generate the tracking and use information for the business and will feed it to the Monitoring and Evaluation officer who will conduct spot checks routinely for quality control. Responsible for ECO cookstoves installation process and delivering training to community beneficiaries.

4.6.3 Project Organizational Chart

The following RACI chart shows the relationship between project tasks and team members. Any proposed changes to project responsibilities must be reviewed and approved by the project manager. Changes will be proposed in accordance with the project's change control process. As changes are made, all project documents will be updated and redistributed accordingly.

	Project Manager	Project Engineer	Develop ment Manager	and Procure ment	Field & Service
Requirements Gathering	A	R	C		I
Cookstoves engineering & design	A	R	1		1
Change Requests	A	R	I	I	1
Site Management	A		C		1
Permits/ Approvals	A	R	C		
Project Scope	A	I	1	R	R
Project Communications	A	R	R	R	1
Project Quality	A	R			1
Stakeholder Management	A	I	C		
Accounting	A			A	

Status Reports	A	R	R		A
Manage Site Workers	A	R			
Procurements	A			A	

Figure 20: RACI Matrix

Source: C. Kabiswa,, September 2019

Key:

R – Responsible for completing the work

A – Accountable for ensuring task completion/sign off

C – Consulted before any decisions are made

I – Informed of when an action/decision has been made

4.6.4 Staffing Management

4.6.4.1   Staff Acquisition

For the ECO ICS project, the project staff will be supplied with internal resources of ECO. However, part of the heavy work related to equipment installation will be subcontracted to external resources (Field Service Engineer). There will be outsourcing/contracting performed within the scope of this project. The managerial staff and office workers will work at ECO cookstove site. The subcontractors and site workers will work on site until contract completion.

4.6.5 Resources Calendar

This project will last for 3years (1000 days). All resources are required before the project can begin. The chart below will explain in detail resources allocation.

Table 17: Resources Calendar Chart [Source: C. Kabiswa, Sept 2019]

Task Name	Description of Work	Duration	Resources	Start	Finish
Initiation Phase	**Request for proposal**	**60days**	Project Manager Project Engineer	July 5, 2019	July 5, 2019
Collect requirements	Meet with project key stakeholders to gather project's needs.	20days	Project Manager Project Engineer Project Development Manager	July 5, 2019	July 25, 2019
Conduct cookstoves preliminary assessment	Will perform assessment of the project to collect baseline data, identify and map out key stakeholders	50days	Project Engineer	July 26, 2019	Oct 15, 2019
Join the improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA) for CDM/Gold Standard/Fairtrade carbon credits	Submit all the required documents to ICSEA for its inclusion in the acclaimed Improved Cook Stoves for East Africa (ICSEA) Programme of Activities (PoA).	20days	Project Development Manager	July 5, 2019	July 25, 2019
Convene a local stakeholder consultative (LSC)	To providing a national input into the design of ECO Improved cook stoves enterprise as a requirement by Gold Standard Activity/ Clean Development Mechanism (CDM) Component Project Activity (CPA).	3 days	Project Manager Project Development Manager	July 25, 2019	July 30, 2019
Stove Development	**Phase where all changes in the production of improved stoves are planned and executed.**	**120days**	Project Manager Project Engineer	Aug 07, 2019	Dec 10, 2019
Engineering and Designing	Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests	60days	Project Engineer	Aug 07, 2019	Oct 10, 2019
Testing	Carry out the efficiency and field	15days	Project Engineer	Nov 10, 2019	Nov 25 2019

Task Name	Description of Work	Duration	Resources	Start	Finish
	test with a minimum of 50 stoves. During the initial testing phase, the project team gathers feedback from users especially on cooking patterns, taste preferences and local beliefs. This includes testing for thermal efficiency				
Detailed designing	Submit all changes required in facilities to execute all the required changes. Each stove model included in the project activity go through a rigorous design process prior to its final certification. This includes the field and and laboratory testing followed by the design iteration based on the feedback collected.	60days	Project Engineer	Dec 1, 2019	Jan 25, 2019
Procurement of materials	Executing required purchases to support production of stoves	20days	Finance and Procurement Officer	Dec 15, 2019	Jan 10, 2020
Production, Distribution and Installation	**Production, distribution and installation of efficient stoves to individual hhs to replace traditional cookstoves**	**900days**	Project Engineer	Mar 12 2020	Jan 27, 2022
Mass production of stoves	Production of stoves that pass both quality assurance test on performance and durability as well as consumer preference and acceptability tests	100days	Project Engineer	Mar 12 2020	Jan 27, 2022

Task Name	Description of Work	Duration	Resources	Start	Finish
Mobilisation and sensitisation of the community	ECO will create awareness among target customers/households regarding improved stoves and will simultaneously promote itself by using different innovating marketing tools such as community music and drama groups.	360days	Field and Service officers	Mar 12 2020	Jan 27, 2022
Distribution, installation & tracking in the households	Includes distribution and installing stoves to household and tracking their use	600days	Field and Service officers	Mar 12 2020	Jan 27, 2022
Monitoring & Verification	Includes monitoring of cookstove distribution and use as well as *carbon monitoring and certification*	720days	Field and Service officers	Mar 15 2020	Jan 26, 2022
Carbon Credit Earnings	Long-term sustainability is completely contingent on securing buyers of carbon credits. Carbon monitoring guarantee a long term contact and feedback from beneficiaries.	720days	Project Manager Project Development Manager Field and Service officers	Mar 15 2020	Jan 26, 2022
Stove maintenance	Routine stove checking and requests for maintenance will be done by the carbon credit income as a way of ensuring that the stoves maintain their thermal efficiency and tracking of the usage of the stoves	100 days	Project Engineer	Dec 15 2020	Jan 26, 2022
Personnel	**The project will hire, train dedicated staff to ensure that it takes off effectively and is a long-term success.**	**1000days**	Project Manager Project Engineer Project Development Manager	July 5, 2019	June 11, 2022

Task Name	Description of Work	Duration	Resources	Start	Finish
Hire appropriate personnel	Hire appropriate and dedicated personnel for the project	30days	Project Manager Project Development Manager	August 5, 2019	Sept 11, 2019
Develop training programs	Works related to develop a training program.	20days	Project Manager Project Engineer	August 5, 2019	Sept 11, 2019
Train personnel	Training execution to chosen personnel.	30days	Project Manager Project Engineer	Sept 11, 2019	Oct 30, 2019
Project Management	**The management of the planning, execution, monitoring and controlling, and closure of the project.**	**1000days**	Project Manager Project Development Manager	July 5, 2019	June 11, 2022
Planning	Planning and updating project activities throughout project lifecycle.	300days	Project Manager Project Development Manager	July 5, 2019	June 11, 2022
Scheduling	Planning of project activities, assigning timeline and dates to determine, and control project duration.	100days	Project Manager Project Development Manager	July 5, 2019	June 11, 2022
Accounting	Monitoring the financial expenditures of the project throughout the project lifecycle.	300days	Project Manager Finance and Development Manager	July 5, 2019	April 11, 2022
Reporting	Documenting project activities, preparing reports and presenting to the appropriate stakeholders.	300days	Project Manager Finance and Development Manager	Oct 15, 2019	June 5, 2022
Meetings	All meetings held to control the management of the project.	200Days	Project Manager Project Engineer Project Development Manager Finance and Development Manager	July 5, 2019	June 11, 2022

4.6.6 Training

Training is required for the Field and Service Officers/workers employed. This training will equip them with the necessary knowledge to install and make necessary repairs for the stoves. Training will include training a network of stove micro-entrepreneurs to promote, install and provide aftersales customer support. To guide these sessions, a project engineer will be contracted to guide and instruct the Field and Service Officers/workers. With respect to the other employees and contracted workers, they are all fully capable of functioning in the capacity for which they have been hired.

4.6.7 Performance Reviews

The Project Manager will review the overall performance of the project during the project lifecycle. At the onset of the project, the Project Manager will communicate with the Engineer, project development manager, finance and procurement officer and Field and service officers to inform them of all the expectations of the work to be performed. Once the Project Engineer turns over the weekly work order to the Field and Service officers, it is his responsibility to manage and evaluate each team member's performance and judge how effectively they are completing the assigned work. Concurrently, it is the Project Engineer's responsibility to evaluate each of his team members in the office and judge how effectively they are completing the work assigned. Prior to releasing project resources in accordance to the payment schedule, the Project Manager will meet with the Project Engineer and provide feedback on employee project performance. In turn, the Project Engineer will meet with the Field and Service Officers to review the formal performance reviews on each team member weekly.

4.6.8 Recognitions and rewards

The system to recognize internal employees will be ECO Recognition Program will be initiated and certain of money will be set aside and this will depend directly on customer/user satisfaction results.

4.7 Communications Management Plan

4.9.1 Communications Management Introduction

The communications plan will serve as a guide to assist in communication between the stakeholders of the ECO improved cookstoves project. The Project Manager and Development Manager will take the primary role in ensuring effective communications on this project. The communications matrix is a major section of this plan. It documents the communication requirements, the information being communicated, the audience for each communication, the frequency of communication, and the individual responsible for the communication or dissemination of the information to the appropriate audience.

4.7.2 Communications Management Approach

In order to ensure that the information flows in a straightforward manner and that key stakeholders are communicated about the project during the project lifecycle at the correct time, the communications management plan a chart was developed using the *PMBOK® Guide*. The plan details how each stakeholder would receive information from members of the project team, the frequency of communication, the information that would be communicated to them and the person responsible for ensuring that the correct information was received by the communication sent.

Table 18: Communications Plan [Source: C. Kabiswa, September 2019]

Communication Type	Deliverable	Description	Delivery Method	Frequency	Owner	Audience
Personal Communication	Project updates	Regular communication.	Telephone Calls	Needs basis	Project Manager Development Manager	Project Sponsor
	Project updates	Regular communication.	Telephone Calls E-mail	Needs basis	Project Manager Development Manager	Project Team
	Project updates	Regular communication.	Telephone Calls E-mail Meetings	As needed	Project Manager	Project Engineer Development Manager
	Project updates	Regular communication.	Telephone Calls E-mail	Daily	Project Engineer	Field and Service Officers/workers
	Project updates	Regular communication.	E-mail	Needs basis	Project Engineer	Users
	Procurement update	Update on status of products	E-mail Conversation Web conference	Weekly	Finance and procurement Manager	Project Manager Project Engineer
Reports	Project status report (Project Process)	Regular update on critical project issues.	E-mail	Weekly	Project Manager	Project Sponsor Project Team
	Quality audit report	Regular updates on project quality performance.	E-mail	Weekly	Project Development Manager Project Engineer	Project Manager Project Team

Communication Type	Deliverable	Description	Delivery Method	Frequency	Owner	Audience
	Financial report	Regular updates on project finances.	E-mail	Weekly	Project Manager	Project Sponsor
	Compliance report	Regular updates on pending permits, extensions, deviations, request for information (RFI), etc.	E-mail	Weekly	Project Manager	Project Sponsor
	Task report	Regular updates on critical project issues pertaining to the external team.	E-mail	Weekly	Project Engineer Development Manager	Project Sponsor
Presentations	Project review	Project status updates.	Meeting	Weekly	Project Manager	Project Manager Project Sponsor Project Team
	Final account	A complete audit of project finances from the project, done at the end of the project. In addition to operational costs' projections.	Meeting	Once	Project Manager Finance and Admin manager	Project Sponsor Project Team
Project Announcements	Task reminders	Task owner schedule reminders.	E-mail	Daily	Project Engineer	Project Manager Project Team

Communication Type	Deliverable	Description	Delivery Method	Frequency	Owner	Audience
	Change Request/Orders	Request to add or remove scope from the project.	Written (Standard Form)	Needs basis	Project Manager	Project Sponsor Project Team
	Project updates	Project updates for Community Members.	Written	Needs basis	Project Manager	Users/Community Members
Reviews and Meetings	Team meeting	Meeting to review project status.	Planning Meeting	Weekly First thing Monday Morning	Project Manager	Project Sponsor Project Team
	Financial report	Regular updates on project finances.	Progress Meeting	Weekly	Engineer Buyer	Project Manager Project Sponsor
	Project status meetings (Project Process)	Regular updates on critical project issues.	Progress Meeting	Weekly	Project Manager	Project Sponsor Project Team
	Planning	Regular updates and project planning.	Progress and Planning Meeting	Daily	Project Manager	Assistant Project Manager

4.7.3 Communications Change Management

In order to keep the right register of changes and communications, please see flow below:

Figure 21: Response Flow chart

Source: C. Kabiswa, September 2019

4.7.3.1   Issue Log

An issue log will be maintained by the project manager that will record all issues that arise in the execution of the project. Relevant personnel will be assigned according to their expertise and competence to ensure continuation of the project in the event of a disruption. Choices will also be influenced by current project status based on forecasts having to do with scope, cost, and schedule control.

Table 19: Issue Log [Source: C. Kabiswa, Sept 2019]

#	Description	Report by	Date	Responsible Officer	Priority	Actions or progress notes	Status	Date Resolved

4.8   Risk Management Plan

4.10.1 Risk Management Introduction

This consists of the development of a full qualitative risk analysis for a project chosen by the group members using the standard proposed in the PMBOK® Guide. A risk register was created focusing on the following four processes of project risk management: create the risk management plan, identify risks, perform qualitative risk analysis, and plan risk responses.   This analysis allows the identification and statement of threats, opportunities, probabilities, impacts, reserves, and response strategies based on the practices recommended for PMI by the project risk management.

4.8.2   Risk Identification

The Risk Breakdown structure (RBS) for the ECO Improved Cookstoves Project can be categorized into 5 categories:

1. Project Management related risks: The most common management related risk is uncertain productivity and estimating of resources. For the case of the project these include existing legal contract issues and labor resourcing with adequately defined roles and responsibilities. These also include risks related to funding, cost overruns are a few of the possible financial risks the project might incur as well as those related to communication

2. External risks: These include weather conditions/natural hazards, product requirements, technology and quality

3. Organisational risks which includes risks related to organizational process assets

4. Stakeholder risks which include risks related to ownership, conflicts, protocols and scope

5. Technical risks: These include uncertainty of resources and availability of materials and equipment, inadequate or incomplete designing. These risks can commonly occur when there are changes in project scope and requirements, and if there are design errors or omissions.
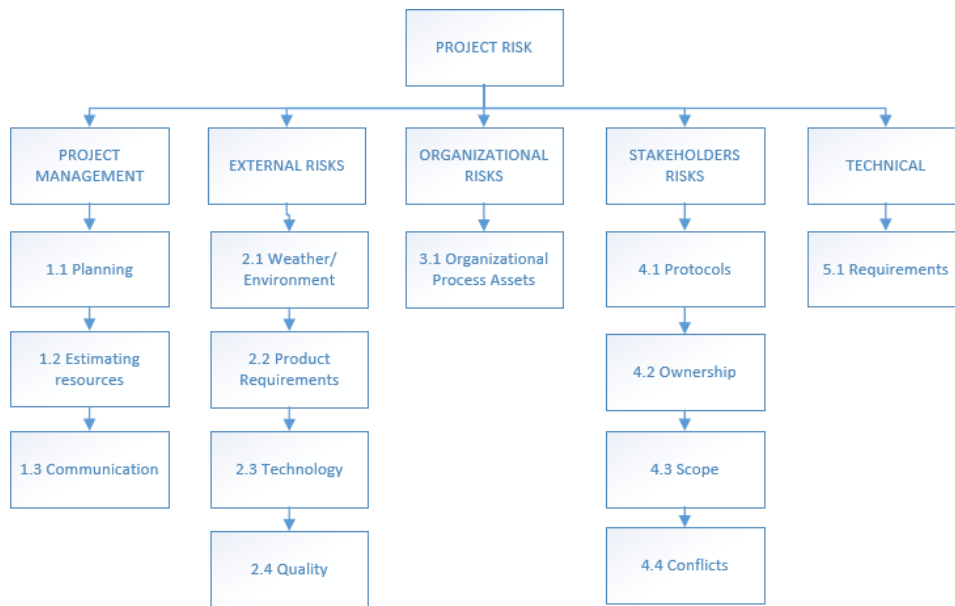
Figure 22: Risk Breakdown structure (RBS)

[Source: C. Kabiswa, September 2019]

4.8.3 Risk Analysis

4.8.3.1   Probability and Impact Scales

To obtain optimal benefit from the risk analysis, it is necessary to define the levels of probability and impact of the project risks. Based on the basic information provided about the project, there is a total budget of two million dollars and an estimated execution time of three years. With the help of these data and the estimates collected from the PMBOK, the following values in table 21 have been calculated:

Risk score is used to rank a risks priority relative to the other identified risks. The risk with the highest risk score is ranked first in priority, the risk with the next highest risk score is ranked second in priority, and so forth. The closer the risk score is to one the highest the priority; the closer a risk score is to zero the lowest the priority.

Table 20: Chart 16 Definition of Probability and Impact Scale [Source: C. Kabiswa, Sept 2019]

Scale	Very Low (0.05)	Low (0.10)	Moderate (0.20)	High (0.40)	Very high (0.80)
Cost	Insignificant cost increase	$2,116,674	$2,116,675-3,000 000	$ 3,000 000 – 6,000 000	> $8,000 000
Schedule	Insignificant time increase	< 30 days	31-60days	61-120 days	> 120 days
Scope	Insignificant scope reduction	Small areas of scope affected	Considerable areas of scope affected	Complete areas of scope affected	Project is inoperative
Quality	Unnoticeable quality reduction	Minor quality reduction	Quality reduction required sponsor approval	Quality reduction unacceptable to sponsor	Project is inoperative

Table 21: Probability and Impact Scale [Source: C. Kabiswa, Sept 2019]

PxI Scale				
Risks	**Probability**	**Impact**	**Risk Score**	**Risk rank with the project**
Technical Requirements	0.50	0.80	0.40	1
Product requirements	0.50	0.80	0.40	2
Quality	0.50	0.80	0.40	3
Technology	0.50	0.80	0.40	4
Estimating resources	0.50	0.80	0.40	5
Weather/ environment	0.50	0.80	0.40	6
Human Resources	0.20	0.80	0.16	Not a priority
Protocols	0.30	0.40	0.12	Not a priority
Scope	0.30	0.40	0.12	Not a priority
Communication	0.20	0.40	0.08	Not a priority

Conflicts	0.20	0.40	0.08	Not a priority
Planning	0.30	0.20	0.06	Not a priority
Ownership	0.20	0.30	0.06	Not a priority
Total Risk Score			3.08	

4.8.3.2 Probability and Impact Matrix

In order to evaluate the importance of each risk and to subsequently classify the risks according to their priority as well as to carry out their corresponding quantitative analysis, the probability and impact matrix will be utilized. This matrix consists of two axes: a vertical axis where the probability ranges from zero (impossible) to one (always) are established and a horizontal axis where the risk impact values are established about the objectives of our project, where zero implies that the risk would not affect and one that it would greatly impede the fulfillment of the project's objectives. The matrix is divided into two parts, on the left the threats are represented and on the right side the opportunities are indicated. On both sides the cells have been colored according to their values, which are the result of multiplying the probability by the impact of the risk, thus obtaining values between zero and one. The highest values correspond to the most critical risks and appear in red and the lowest that are the least relevant appear in green. Due to the characteristics of the project and the urgency to improve the problem of use of traditional cookstoves and the possible negative impact of this practice, it has been decided to classify the values of the risks according to the following ranges: < 0,05: LOW; 0.05 - 0.15: MEDIUM; 0.15: HIGH.

In this way, the risks that the project incurs to all stakeholders can be put on the table so that each one assumes his or her own responsibilities and likewise avoid or minimize possible contingencies. The matrix obtained is as follows:

Table 22: Probability and Impact Matrix [Source: C. Kabiswa, Sept 2019]

Likelihood	Threats				
FREQUENT (0,90)	0.05	0.09	0.18	0.36	0.72
LIKELY (0.70)	0.04	0.07	0.14	0.28	0.56
POSSIBLE (0.50)	0.03	0.05	0.1	0.2	0.4
UNLIKELY (0.30)	0.02	0.03	0.06	0.12	0.24
RARE (0.10)	0.01	0.01	0.02	0.04	0.08
	VERY LOW (0.05)	**LOW (0.10)**	**MODERATE (0.20)**	**HIGH (0.40)**	**VERY HIGH (0.80)**

4.8.4 Risk Register

Table 23: Risk Register [Source: C. Kabiswa, Sept 2019]

RBS Code		Cause	Risk	Consequence	Probability	Impact	PXI	Trigger	Owner	Strategy
5.1	Technical Requirements	Late start due to CDM's and ICSEA-PoA's requirements	Possibility of late start of the project if requirements not met	Delay to approve the project	0.50	0.80	0.40	Failure to pass the test	Project Manager Project Engineer	Plan for possible delays. Initiate procurement process earlier to eliminate effect on the critical path.
2.2	Product requirements	Late start is the CDM's 20% minimum thermal efficiency requirements	Possibility of late start of the project if product requirements are not met	Delayed design & redesign & approval of the stoves	0.50	0.80	0.40	Late material request for the protype and late testing	Project Engineer	Plan for possible delays. Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests
2.4	Quality	Lack of training. Inadequate training process.	Inadequate number of skilled workers from the technical agencies.	Reduction in quality of work.	0.50	0.80	0.40	Outsourced company without experience in this type of projects.	Project Engineer Field Service officer	Review training programs and align it to business needs.
2.3	Technology	Project engineer having other priorities running concurrently.	Delays in stove design, approval and installation.	Schedule delays.	0.50	0.80	0.40	Schedule delayed by several weeks	Project Engineer	Establish an exclusive agreement with project engineer to finish the project on time.
1.2	Estimating resources	Lack of information, benchmark.	Inaccurate cost estimates.	Cost overruns.	0.50	0.80	0.40	Quotations of higher amounts during procurement process.	Project Engineer Finance & Procurement officer	Realistic estimation of the costs of the project. Seek more affordable alternative source of resources. Consult with sponsors to explore increasing budget.

2.1	Environment Policies/impact	Late approvals due National Environmental policies and UN Safety and Environmental policies	There is a possibility of delay due to failure for the project to adhere to National Environmental policies and UN Safety and Environmental policies	Increased time spent on meeting environment requirements	0.50	0.80	0.40	No approval for the project components	Project Development Manager External UN-accredited auditor	Audit all the steps in the project to meet Safety and Environmental policies and approval processes are expedited
3.1	Human Resources	Organizational process assets / human resource challenges	Possibility of headcount allocation constraint due to project priorities.	Deliverables/ targets not met.	0.20	0.80	0.16	Priorities re-spin.	Project Manager	Acquire written agreements from project sponsor outlining their commitment(s) to the project.
4.1	Protocols	Some high level stakeholders may be bureaucratic	Bureaucratic tendencies of stakeholders like the UN and government may constrain project implementation	Increased time spent on going through different protocols of different agencies	0.30	0.40	0.12	Schedule delayed by several weeks due to different protocols	Project Manager Project Development Manager	Plan integrative stakeholder management throughout the life of the project.
4.3	Scope	Inadequate stakeholder engagement	Emergence of overlooked project stakeholder.	Change in project scope, cost, and schedule.	0.30	0.40	0.12	Incorrect/lack of data on "Stakeholder Matrix"	Project Manager	Plan integrative stakeholder management throughout the life of the project.
1.3	Communication	Poor communications.	Possibility of conflict arising between project stakeholders.	Delay in agreement on project scope.	0.20	0.40	0.08	Lack of agreement during scope and schedule planning.	Project Manager Project Development Manager	Ensure that each stakeholder understands their roles and responsibilities and that communication follows the communication matrix. Establish clear definitions of stakeholder roles and responsibilities. Adhere to communication structure as established in the communication matrix.

					0.20	0.40	0.08			
4.4	Conflicts	Inadequate stakeholder engagement	Possibility of stakeholders having inaccurate expectations because of poor communications.	Minimized participation and community buy-in.				Requests being made outside of agreed scope.	Project Manager	Ensure that communication channels chosen for each stakeholder are easily accessible and agreed upon and that timely communication is done.
1.1	Planning	Inadequate stakeholder engagement	Possibility of stakeholders becoming disengaged.	Minimized participation and community buy-in.	0.30	0.20	0.06	Low attendance to meetings/ feedback sessions.	Project Manager Project Development Manager	Project Manager's engagement/involvement in order to avoid gaps in the project.
4.2	Ownership	Inadequate stakeholder engagement	Possibility of stakeholders becoming disengaged.	Minimized participation and community buy-in.	0.20	0.30	0.06	Low attendance to meetings/ feedback sessions.	Project Manager Project Development Manager	Project Manager's engagement/involvement in order to avoid gaps in the project.

4.9   Procurement Management Plan

4.11.1 Procurement Management Introduction

This procurement management plan sets the procurement framework for this project. It will serve as a guide for managing procurement throughout the life of the project and will be updated as acquisition needs change. A make-or-buy analysis will not be used for this project as some of this information already exists in the stove engineering specifications and requirements defined during project initiation, which can be found in the project charter. In addition, due to the vast experience and technical expertise of the project management team including the project engineer, the items to be purchased and made are already known. This plan identifies and defines the items to be procured, the types of contracts to be used in support of this project, the contract approval process, and decision criteria. The importance of coordinating procurement activities, establishing project contract deliverables, and utilizing metrics in measuring procurement activities is included. Other items included in the procurement management plan are procurement risks and procurement risk management considerations and how costs will be determined, how standard procurement documentation will be used, and which could be the procurement constraints.

4.11.2 Procurement Management Approach

In order for a project to be successful, it must be able to acquire all the necessary items needed to meet project objectives. In regard to this, a procurement management plan acts as the guideline as it sets the procurement framework for the project. This project, due to its nature, had a simple procurement management approach as there were no contractual agreements. The Project Manager working with Finance and Procurement Officer had the overall responsibility for the procurement of the project items and delegated specific responsibilities to project team members to ensure that all items were procured for the successful completion of the project. The project team, along with major project stakeholders, made the make-or-buy decision for each procurement item on a meeting. The procurement list was frequently reviewed to ensure that items to be purchased

were ordered, delivery dates were within the project schedule, and any approved changes were inputted. The procurement management plan was well defined and clear enough to identify the necessary steps and responsibilities for procurement from the project initiation to its closing.

4.11.3 Procurement Definition

The following procurement items or services have been determined to be essential for project completion and success. The following list of items, justification, and timeline are pending Project Manager review for submission to the assistant project manager for purchasing to commence:

Table 24: Procurement Items [Source: C. Kabiswa, Sept 2019]

Item	Justification	Needed by
ICSEA COMPOSITE FEES (ICSEA/DOE/Testing Labs) & GOLD STANDARD FEES	Annual support/monitoring/verification fees (EUR) (Each CPA will differ depending on complexity & cost - paid in each year at the time of verification confirmation)	July 5, 2019
	GS annual verification & issuance fees plus GS Annual Account fee allocated to ECO	July 25, 2019
TRACKING & DISTRIBUTION	Includes distribution and installing stoves to household and tracking their use	Mar 12 2020
Logbook printing	For stoves sales agreement users	Dec 15, 2019
Stove production	Production of stoves that pass both quality assurance test on performance and durability as well as consumer preference and acceptability tests	Mar 12 2020
Graphic designing and printing cost	For branding of ECO improved cookstoves	Dec 15, 2019
Stove serial number tags	For unique serial numbering and tags	Mar 12 2020
Marketing and promotions	Adopt a social marketing strategy that will emphasize the health and economic benefits of the use of efficient cook stoves to the customers	Mar 12 2020 on going
Field monitoring and quality control	Includes distribution and installing stoves to household and tracking their use	Mar 12 2020 on going

Fuel for distribution and mobilization	For continuous mobilization, delivery and awareness creation and monitoring of stoves	Mar 12 2020 on going
Business Documentation generation of reports and case stories)	Documenting project activities, preparing reports and presenting to the appropriate stakeholders.	Mar 12 2020 on going
STOVE MAINTENANCE	Stove maintenance (from year 2 onwards, based on cumulative in-use stove numbers	Dec 1 2021
	Maintenance training costs	June 15 2020
COMMUNITY BENEFIT	After the deduction of the business direct costs, the remaining revenue generated from the carbon credit sales will be allocated to the community projects. The communities in their various groups will decide on what projects they want to undertake using this resource.	Dec 15 2020
CAPITAL EXPENDITURE		
Stove store (purchase of 2, 20-feet containers)	For storage of produced stoves	January 15 2020
Vehicle (Purchase of 1 truck) for transportation from stove manufacturer	For transportation and delivery of stoves, supplies and materials	Dec 10, 2019
Delivery tricycles (4 vans) for distribution to households	For household to household/ stove end users delivery of stoves	Dec 10, 2019
Computer hardware & software (4 desktops and 1 laptop)	Record and database management and backups	July 5, 2019
Purchase of 2 digital professional cameras with stands, backup batteries and lenses	Professional photography and documentation	July 5, 2019
Purchase of 2 GPS devices	Marking, physical identification and location of stoves users	July 5, 2019
Office furniture (chairs, tables, shelves, safe)	Support staff work environment	July 5, 2019
Staff list, salary costs and trainings allocation to the stoves programme	Staff time, compensation and renumeration	July 5, 2019
Project Manager	Personnel to authorize and approve all project expenditures. Ensure that work activities meet	July 5, 2019

	established acceptability criteria and fall within acceptable variances.	
Project Engineer	Personnel to design stove model meets quality assurance test on performance as well as consumer preference and acceptability tests	July 5, 2019
Development Manager	Personnel to provide strategic vision to project manager and expedite approval processes. Audit all the steps in the project to meet Safety and Environmental policies.	July 5, 2019
Finance & Procurement Officer	Personnel needed for project accountability, outline the characteristics of the procurement process; this includes shipping timeframe and estimating logistics costs.	July 5, 2019
Training of staff	Equip project team with necessary skills to implement the project	Sept 30 2019 on going
Administrative costs (office expenses and supplies)	Operational costs for the project	July 5, 2019
Office Rent	To house the project	July 5, 2019 on going
Office stationery	Support operation of project	July 5, 2019 on going
Utilities (electricity & water)	Running of the office	July 5, 2019 on going
Internet	Running of the office	July 5, 2019 on going
Office telephone (Airtime for communication)	Communication	July 5, 2019 on going
1 Truck and 4 vans Annual comprehensive insurance	Insurance cover	July 5, 2019 on going
Quarterly staff meetings	All meetings held to control the management of the project.	October 5 2019 on going
Annual multi-stakeholder meetings	To providing a national input into the design of ECO Improved cook stoves enterprise as a requirement by Gold Standard Activity/ Clean Development Mechanism (CDM) Component Project Activity (CPA).	Jun 6 2020
Travel to conferences, meetings and seminars	Documenting and sharing project activities, preparing reports and presenting to the appropriate stakeholders.	Jun 6 2020

In addition to the above list of procurement items, the following individuals are authorized to approve purchases for the project team:

- Project Manager: Charles Kabiswa

- Finance and Procurement Officer: Kwazza Cissy

- Project Sponsor: Kirsten

For make-buy analysis, it should be straightforward since all the items need to be bought due to the complexity of the parts and the mechanical precision.

4.11.4 Type of Contract to be Used

Services required for works such as the training of staff especially the field service officers to be procured for this project will be solicited. The project team will work with the finance and procurement officer to define the item types, quantities, services, and required delivery dates then request bids from various vendors. Once the vendor is selected, procurement of the items within the required period and at a reasonable cost (based on contract conditions) will commence.

4.11.5 Cost Determination

For this project, the team will issue a Request for Quote (RFQ) in order to solicit proposals from the vendor for equipment installation and training, which describe how they will meet our requirements and its cost. All proposals will include vendor support for all items from the procurement definition paragraph as well as the base and out-year costs. The vendors will outline how the work will be accomplished, who will perform the work, vendors' experience in providing these goods, customer testimonials, backgrounds and résumés of employees performing the work, and a line item breakdown of all costs involved.

All information must be included in each proposal, as the proposals will be used as the foundation of the selection criteria. Proposals which omit solicited information or contain incomplete information will be discarded from consideration.

4.10   Stakeholder Management Plan

4.10.1 Stakeholder Management Introduction

Stakeholder management includes the processes required to identify the people, groups, and organizations that could affect or be affected by the project, to analyze the stakeholder's expectations and their impact on the project, and to develop strategies and tactics for effectively engaging the stakeholders in an appropriate manner to their interest and involvement in the project. The stakeholder management plan helps to ensure that stakeholders are effectively involved in project decisions and execution (PMBOK 6th Edition) throughout the lifecycle of the project, to gain support for the project, and anticipate resistance, conflict, or competing objectives among the project's stakeholders.   The stakeholder management plan includes several sections:

- Identify stakeholders: identify by name and title the people, groups, and organizations that have significant influence on project direction and its success or who are significantly impacted by the project.

- Plan stakeholder management: identify the strategies and mechanisms that will be used to achieve the greatest support of stakeholders and minimize resistance.

- Manage stakeholder engagement: it outlines the processes and steps that will be undertaken to carry out the planned strategies.

- Control Stakeholder Engagement – it describes the methods that will be used to monitor stakeholder engagement and alert the project team if problems are surfacing.

4.10.2 Stakeholders Identification

In order to develop an effective plan for managing stakeholders, they first need to be clearly identified and assessed. Stakeholders will be identified by performing a stakeholder analysis in which potential stakeholders and relevant information such interests, involvement, interdependencies, influence, and potential impact on project success are gathered, documented, and analyzed. (PMBOK 6th Edition).

It is necessary to develop a stakeholder analysis register to assist with stakeholder identification and analysis. The stakeholder analysis register captures the following information: stakeholder, functional area, roles and responsibilities, main expectations, major requirements, influence and impact, and classification.

Table 25: Stakeholders Identification [Source: C. Kabiswa, September 2019]

Stakeholders	Functional Area	Roles – Responsibilities
Project Manager	Staff	Authorize and approve all project expenditures. Ensure that work activities meet established acceptability criteria and fall within acceptable variances. Report project status. Evaluate the performance of all project team members.
Project Engineer	Staff	Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests Track installation progress and solve technical issues. Create the list of required spares and consumables. Send weekly reports on the progress of the project to the PM
Project Development Manager	Staff	To provide strategic vision to project manager and expedite approval processes. Audit all the steps in the project to meet Safety and Environmental policies.
Finance and Procurement Officer	Staff	Project accountability, outline the characteristics of the procurement process; this includes shipping timeframe and estimating logistics costs.
Field Service Engineer	Service Provider	Responsible for equipment installation process and delivering training and offer maintenance services
Bread for the World (BfW)	Sponsor	To provide strategic direction to the project manager and expedite approval of the process and necessary funds
Improved Cook Stoves for East Africa (ICSEA)	Technical Capacity	Technical capacity to support the business for inclusion into its PoA so that the stove users can earn carbon credits
UN Auditor	External UN-accredited auditor	Annually monitor the business to ensure that Audit all the steps in the project to meet UN Safety and Environmental policies.

Stove sellers, distributors Community-based organisations (CBOs)	Distributors	Agreements will be signed with CBO partner, in accordance with the ICSEA PoA's guidance note on the use of third-party Distribution Partners
Buyers of the carbon credits	Carbon buyers	To submit complaints (feedback) to the project regarding cookstoves activities. Submit all the purchase orders for spares and consumables.
End users (community members)	Stove users	Use the stoves and keep them in good shape upon purchase. The carbon credit income will be shared with the stove users as part of their benefits since they are the creators and owners of the credits.

Table 26: Stakeholder Register Matrix [Source: C. Kabiswa, Sept 2019]

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
Project Name	ECO Improved Cookstoves Project						
Main Sponsor	Bread for World						
Note: Stakeholder Register will be consulted and updated on regular basis as stakeholders may change through the lifecycle of the project							
1	Project Manager	Staff	Authorize and approve all project expenditures. Ensure that work activities meet established acceptability criteria and fall within acceptable variances. Report project status. Evaluate the performance of all project team members	Authorize and approve all project expenditures. Ensure that work activities meet established acceptability criteria and fall within acceptable variances. Report project status. Evaluate the performance of all project team members	Sufficient resources to properly execute the project. Successfully deliver the project within the project constraints. Ensurre low cost of operations	Influence:High Impact: High	Internal
2	Project Engineer	Staff	Project engineering and project management	Designing of stove model meets quality assurance test on performance as well as consumer preference and acceptability tests Track installation progress and solve technical issues.	Meet community stove user expectations	Influence:High Impact: Medium	Internal

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
				Create the list of required spares and consumables. Send weekly reports on the progress of the project to the PM			
3	Project Development Manager	Staff	To provide strategic vision to project manager and expedite approval processes. Audit all the steps in the project to meet Safety and Environmental policies.	Audit all the steps in the project to me Safety and Environmental policies and approval processes are expedited	Develop and grow business minimised risks during production and installation	Influence:Medium Impact: Medium	Internal
4	Finance and Procurement Officer	Staff	Project accountability, outline the characteristics of the procurement process; this includes shipping timeframe and estimating logistics costs.	Follow the procurement and accountability process and accurate estimating of logistics costs.	Transparent and competitive bidding, adherence to contractual agreements	Influence:Low Impact: Medium	Internal
5	Field Service Engineer	Service Provider	Responsible for energy cookstoves installation process and delivering training and offer maintenance	Ensure that the ICS are installed, in use and maintenance offered	Lobby for customer feedback	Influence:Low Impact: High	Internal

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
			services				
6	Bread for the World (BfW)	Sponsor	To provide strategic direction to the project manager and expedite approval of the process and necessary funds	Ensure that the timely transfer of project funds and strategically guide the project manager	Sufficient resources to properly execute the project.	Influence:High Impact: High	External
7	Improved Cook Stoves for East Africa (ICSEA)	Technical Capacity	Responsible for support ICS project inclusion into its PoA	Technical capacity to support the business for inclusion into its PoA so that the stove users can earn carbon credits	ICS project is included into its PoA so that the stove users can earn carbon credits	Influence: Low Impact: Medium	External
8	UN Auditor	External UN-accredited auditor	Audit all the steps in the project to meet UN Safety and Environmental policies.	Annually monitor the business for compliance to UN Safety and Environmental policies and procedures	UN Safety and Environmental policies and procedures compliance	Influence: High. Impact: Medium	External
9	Stove sellers, distributors Community-based organisations (CBOs)	Distributors	Submit all the purchase orders for spares and consumables. Agreements will be signed with CBO partner, in accordance	Sign agreements with CBO partner, in accordance with the ICSEA PoA's guidance note on the use of third-party Distribution Partners	To submit complaints (feedback) to the project regarding cookstoves activities	Influence: Low Impact: High	External

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
			with the ICSEA PoA's guidance note on the use of third-party Distribution Partners				
10	Buyers of the carbon credits	Carbon buyers	Offer competitive and attractive prices for the carbon credits	Ensure that the carbon credits earned by the households is purchased at attractive prices	Markets for the carbon credits are earned	Influence: Medium Impact: High	External
11	End users (community members)	Stove users	Use the stoves and keep them in good shape upon purchase.	The carbon credit income will be shared with the stove users as part of their benefits since they are the creators and owners of the credits.	Ensure the stoves are in proper use and well maintained	Influence: Low Impact: High	External

4.10.2.1 Power-Interest Classification

The project is assessing each group's position as well as their impact on the project or how they are impacted by the project. One purpose of this activity is to help identify and categorize groups so that appropriate attention can be given to each group, according to the level of engagement needed. To help in this process, the project will use the PMBOK Power/Interest Grid to categorize each stakeholder group. The Power/Interest Grid analyzes stakeholder groups in a visual manner to further establish stakeholders' level of interest or concern and their ability to influence the project outcomes.

An important outcome of the stakeholder identification and analysis work, including the Power/Interest Grid, is to identify the most influential and most impacted stakeholder groups so that a focused stakeholder management strategy and plan can be developed and executed.
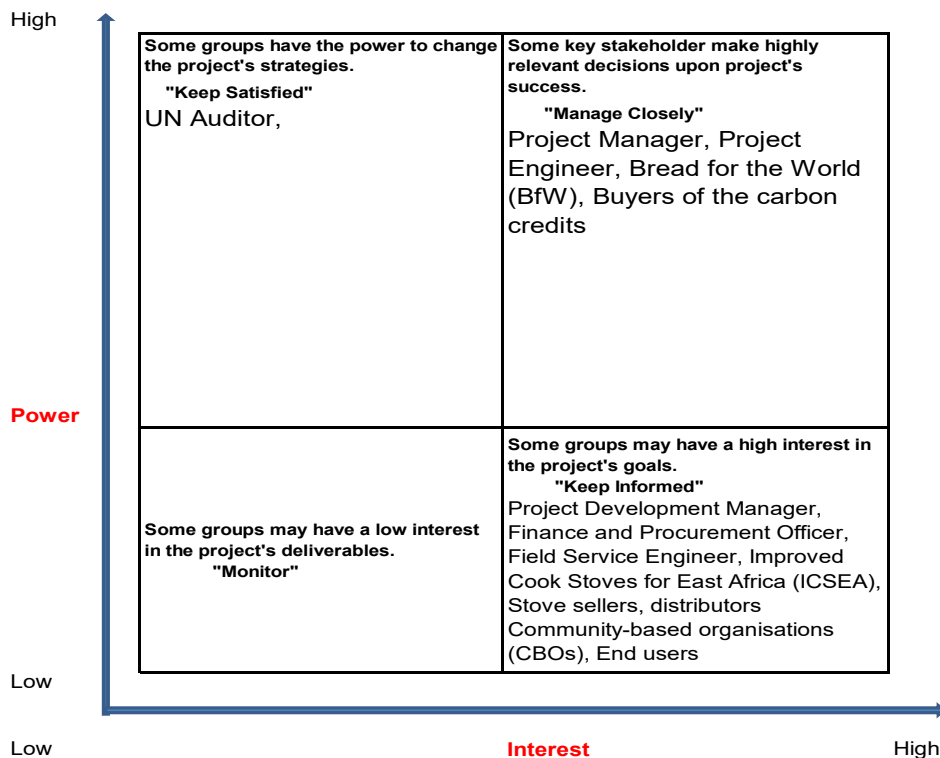
Figure 23 Power-Interest Classification

Source: C. Kabiswa, Sept 2019

4.10.2.2   Stakeholder Interviews

To confirm that the stakeholder identification and analysis process is accurate and complete, the project team led by the Project Manager will help facilitate a series of reviews with the project team. In addition, optional qualitative interviews may be conducted to the stakeholder groups identified as most influential or most impacted by the project to validate that their issues and concerns have been captured accurately.

4.10.3 Plan Stakeholder Management

The plan stakeholder management is the process of developing appropriate management strategies to effectively engage stakeholders throughout the lifecycle of the project based on the analysis of their needs, interests, and potential impact on project success. The key benefit of this process is that it provides a clear, actionable plan to interact with project stakeholders to support the project's interests (PMBOK 6th Edition).

Based upon the information gathered in the stakeholder analysis register and communication plan, the Project Manager will be responsible for engaging stakeholders throughout the lifecycle of the project. The level of engagement required for each stakeholder may vary over the course of the project. For example, during the early stages of the project, it might be necessary for the Project Manager to engage key stakeholders to be highly engaged. Highly engaged key stakeholders in the early stages of the project are pivotal for project commencement, achieving staff buy-in, and clearing obstacles. As the project progresses, the level of engagement will shift from key stakeholders to the broader project team and end users.

4.10.4 Manage Stakeholder Engagement

Stakeholder engagement management is the process of communicating and working with stakeholders to meet their needs and expectations and to address issues as they occur. Stakeholder engagement management is the process to systematically foster appropriate stakeholder engagement in project activities throughout the life of the project. The key benefit of this process is that it allows the Project Manager to increase support and minimize resistance from stakeholders; thus, significantly increasing the chances to achieve project success (PMBOK 6th Edition).

To effectively manage stakeholder engagement, ECO ICS project will utilize the communication plan and strategies identified above to communicate project related information to key stakeholders in a proactive and timely manner. Leveraging the information provided in the communication plan (i.e. stakeholder groups, communication items, purpose, method of communication, and frequency), the project will have the ability to increase support and minimize stakeholder resistance throughout the life of the project. Managing stakeholder engagement helps to increase the probability of project success by ensuring that stakeholders clearly understand the project goals, objectives, benefits, and risks.

In line with the analysis above, the project team will also be actively listening and soliciting input and feedback to make sure communications are not only being received and understood, but also to capture important information to help adjust and respond to problem areas.

Other project artifacts will factor into stakeholder management as well, including the list of business process changes and the change control process, both of which consider the impact on stakeholders. The project issues log is another tool to collect, document, and address concerns raised by stakeholders and stakeholder management risks that have materialized into issues that must be managed.

4.10.5 Monitor Stakeholder Engagement

Monitor stakeholder engagement is the process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders. Monitor stakeholder engagement involves collecting data, assessing the level of engagement, and using insights from the data collection to adjust strategies and tactics for engaging effectively with stakeholders. As mentioned in the communications plan and the risk management plan, the ECO ICS project will have mechanisms to receive ongoing direct feedback from key stakeholders.

Individual stakeholders will be encouraged to participate and to voice questions and concerns. In regard to the most serious issues and concerns that are raised, they should be addressed in a formal, rigorous process through the issues and risk logs. As described in the scope management plan, the project will solicit broad participation in the collection and validation of requirements, which will uncover issues and concerns early on, so they can be addressed. Stakeholders are critical to the project's success. The project team has planned to involve, engage, and listen to all key stakeholders throughout the project lifecycle and they will work to achieve it.

5   CONCLUSIONS

1.   The Project Charter was the first subsidiary element of the Project Management Plan, created as the deliverable for specific objective number one. Using a template as a guide, to capture and organize the business needs and objectives, project description, preliminary scope statement, initial project risks, project deliverables, summary milestones, and project budget, the Project Charter also included identification of the project manager and the sponsor's authorization for the project to commence. This project management plan added structure and improved operational competencies for ECO improved cookstoves project through the use of templates and documented processes on how to communicate, request, and track changes along the project development in order to prevent the stakeholders to be miscommunicated in regards to the project.

2.   Scope management plan including WBS, WBS dictionary, captured the information regarding project requirements and stakeholders' needs through meetings. These requirements were listed keeping in the loop assumptions and constraints as well.

3.   Regarding the third specific objective of this project, which is the schedule management plan, it was created based on a detailed activity list. By having this ready, a project Gantt chart was developed in order to adequately identify each project activity to ensure the project's completion within the time constraints.

4.   Cost management plan, the fourth specific objective, involves project costs planning, structure, and control. With activity cost estimates, the project budget was calculated including reserve and baseline costs.

5.   For the fifth subsidiary plan, which is the quality management plan, it specified the processes needed in order to ensure quality along with the use

of templates and checklists that are required by ECO guidelines that will help to forget any key item.

6. In regard to the resource management plan, as the sixth specific objective, roles and responsibilities identification was critical in order to create a RACI chart to show the relationship between project tasks and team members. In addition, a resources calendar was developed to have more visibility around resources allocation.

7. The Communications Management Plan refers to the specific objective number seven. In order to achieve it, communications matrix was developed, detailing all project stakeholders' names, titles, information, and format throughout the project lifecycle and ensuring that the information disseminated during the project was done at the right time, in the right format, for the right people, and by the right person.

8. The deliverable number eight, which is the risk management plan, was based on risk identification and a detailed analysis on probability and impact in order to evaluate the importance of each risk and to subsequently classify the risks according to their priority as well as to carry out their corresponding quantitative analysis and its priority.

9. In relation to the procurement management plan, all the items to be procured were identified and listed along with the required date. This plan also includes the type of contacts to be used and the cost determination approach.

10. Regarding the stakeholder management plan, it is important to ensure that anyone who can influence or who will be affected by the project is identified. This plan, besides the identification plan, also provides the process to classify and manage the stakeholders in a detailed way through stakeholders register.

11. PMBOK® Guide 6th Edition provided a set of good project management practices in order to develop a more systematic project management plan and to ensure if any key item is missing from the beginning to the end of the project.

6   RECOMMENDATIONS

1. ECO improved cookstoves project must use the formal and documented processes for project management to minimize the risk of missing critical items for projects completion.

2. ECO ICS project needs to create document management and storage system as a repository share drive to store all the projects developed for the organization in order to have more accessibility to historical information, previous learnings and future use.

3. ECO should create and develop a project management team to consistently repeat project management methodologies in all projects to minimize variability from project to project.

4. ECO should invest in the tools required to complete quantitative risk analyses for all projects like ICS.

5. ECO should use a Project Management Guide or Framework to direct the development of all project management tools.

6. To pursue the implementation of project management culture by creating awareness on the importance of meeting milestones and meeting products life cycles target dates without issues.

7. The project should ensure that the project management team is hired and in place prior to the execution of any project and ensure that this team conduct all project planning related activities in order to enhance the proper management of the ECO Improved cook stoves project during its lifecycle.

8. The project management team should consider the use of the planning process and templates created during the development of the Project Management Plan for the ECO ICS project, as a basis for implementing a methodology to be used by the ECO for future projects of similar relevance.

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8   APPENDICES

Appendix 1: FGP Charter

PROJECT CHARTER	
Date	**Project Name:**
17th May, 2019	Project Management Plan for the production and distribution of ECO Improved Cookstoves Project for communities in the Lake Victoria Basin, Uganda
Knowledge Areas / Processes	**Applicacion Area (Sector / Activity)**
Knowledge areas: Scope Management Schedule Management Cost Management Quality Management Resource Management Communication Management Risk Management Procurement Management Stakeholder Management **Process groups:** Initiation Planning Executing Monitoring/Control Closing	Clean and Efficiency Energy technologies
Start date	**Finish date**
13th May, 2019	11th August, 2019
Project Objectives (general and specific)	

General objective:

To develop a Project Management Plan for the production and distribution of ECO Improved Cookstoves Project that meets the standards of the Project Management Institute for communities in the Lake Victoria Basin, Uganda.

1. To create a project charter that formally authorizes the project and provides the project manager with the authority to apply organizational resources to the project in order to produce the project management plan.

2. To create a scope management plan to ensure that all works required are included to successfully complete the project.

3. To create a schedule management plan to support the development and management of a project schedule that ensures the project is completed within the time constraints.

4. To create a cost management plan to define the processes for developing and managing a project budget that ensures the project is completed within the budget constraints.

5. To develop a quality management plan to identify the quality requirements for the project to ensure the results meet expectations for approval within the time, cost and scope constraints.

6. To create a resource management plan to ensure that all human resources are identified and managed effectively to complete the project within time, cost and scope constraints.

7. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.

8. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.

9. To develop a procurement management plan to be used to obtain products, services or results required by the project.

10. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.

Project purpose or justification (merit and expected results)

The project seeks to establish the extent to which the development and implementation of a Project Management Plan will help the Ecological Christian Organization (ECO) complete its production and distribution of ECO Improved Cookstoves Project within a reasonable time frame and quality according to detailed time management plan. It will also seek to identify the cost saving that may be achieved by proper cost estimates prepared and monitored and controlled by qualified Project Managers. ECO's current initiatives focus on natural resource governance, climate change adaptation and resilience, and ecosystem management and restoration. But experiences challenges in effective project management due to the lack of Project Management Professionals at the earliest stages of the project to coordinate the numerous planning activities necessary to ensure successful project completion within the constraints of a typical project. The project will help to determine how to use the available resources most effectively as well as time, risk, scope, and human resources considerations used during the planning phase of a project and their impact on project success.

Description of Product or Service to be generated by the Project – Project final deliverables

The project management plan for production and distribution of ECO Improved Cookstoves Project for communities arround the Lake Victoria Basin, Uganda will be generated by this project. The specific deliverables most pertinent to this project's objectives will capture the following information:

- Project charter
- Plan of the exact intention of the project scope.
- schedule management plan
- Cost management plan with guidelines on prudent programme expenditure and fund generation practices.
- Quality management plan
- Resource management plan
- Plan specific to communication methods and channels.
- Risk management plan

• Procurement management plan
• Collation and categorization of stakeholders and their associated requirements.
Assumptions
• It is assumed that the knowledge acquired from the Master's in Project Management courses is sufficient for the complete execution required for the final graduation project.
• It is assumed that a proper support system will be made available to student by university staff.
• It is assumed that the student will have enough time to complete assignment within scope and time.
• It is assumed that the university will remain open throughout the duration of the final graduation project.
• It is assumed that the requirements for the FGP will remain unchanged as currently established.
• Expansion of the ECO-ICSB to other districts through ECO's work with local institutions and community structures with its other programmes is possible
• Global interest in the environment and climate change agendas is expanding the market for offset carbon credits continue
• Partnerships with other clean energy programmes are maintained
Constraints
• The time duration of 3 months might not be enough for the completion of the Final Graduation Project (FGP).
• Balancing work and my daily activities with the demand of the project
• The student may not always comprehend the tutors instructions in the initial instance.
• Budget constraint should it become necessary for physical visits to remote or distant areas for the facilitation of the project completion
• Unregulated distribution of sub-standard cheap products
• Stove prices might rise due to higher production costs
• Unpredictable market prices for the carbon credits, hence interest in Fairtrade

accreditation and its minimum price for the purchase of its accredited carbon credits.

Preliminary risks

- Grades standing may be forfeited for late submissions

  Missing deadlines and weekly requirements where instructions and guidelines are not clear

- Competition from other commercial and non-commercial local organisations that are involved in promoting cook stoves for distinct reasons – i.e. profit vs. social mission vs. political posturing.

- Sustainability risks. The target clients are vulnerable households in rural areas with limited resources to purchase cook stoves at full price.

- Transport risks. The stove liners will need to be moved without damage from Mubende Stoves Ltd to the Phase 1 target area (Mayuge district). This has risks in terms of accidents and costs.

- Resistance to change. The business might face resistance from community members who believe that it is against their cultural norms and values.

- Technological risk. The technologies about the efficient energy cooking stoves keep on improving from time to time due to new innovations in the sector

Milestones and dates

Milestone	Start date	End date	
Final Graduation Project	May 13, 2019	Aug. 11, 2019	
1. Graduation Seminar	May 13, 2019	June. 14, 2019	
1.1 FGP deliverables	May 13, 2019	June. 7, 2019	
1.1.1 Prepare Charter	May 13, 2019	May. 17, 2019	
1.1.2 Prepare WBS	May 13, 2019	May. 17, 2019	
1.1.3 Chapter I - Introduction	May 20, 2019	May. 24, 2019	
1.1.4 Chapter II – Theoretical Framework	May 27, 2019	May 31, 2019	
1.1.5 Chapter III – Methodological Framework	Jun 3, 2019	June. 7, 2019	

1.1.6 Annexes	May 20, 2019	June. 7, 2019	
1.1.6.1 Draft Bibliography	May 11, 2019	June. 7, 2019	
1.1.6.2 Prepare FGP Schedule	May 11, 2019	May. 24, 2019	
1.2 Graduation seminar approval	May 11, 2019	June. 15, 2019	
2. Tutoring process	Jun. 17, 2019	Sep. 13, 2019	
2.1 Tutor	Jun. 17, 2019	Jun. 20, 2019	
2.1.1 Commence Tutor assignment	Jun. 20, 2019	Jun. 21, 2019	
2.1.2 Establish Communication	Jun. 22, 2019	Jun. 24, 2019	
2.2 Adjustments of previous chapters (if required)	Jun. 24, 2019	Jun. 28, 2019	
Tutor approval	July. 17, 2019	Sep. 13, 2019	
3. Reading by reviewers	Sept. 16, 2019	Oct. 14, 2019	
3.1 Reviewers assignment request	Sept. 16, 2019	Sept. 20, 2019	
3.1.1 Assignment of two reviewers	Sept. 20, 2019	Sept. 22, 2019	
3.1.2 Establish Communication	Sept. 23, 2019	Sept. 25, 2019	
3.1.3 FGP submission to reviewers	Sept. 25, 2019	Sept. 26, 2019	
3.2 Reviewers work and Feedback	Sept. 27, 2019	Oct. 02, 2019	
4. Adjustments	Oct. 7, 2019	Nov. 1, 2019	
4.1 Receive Report for reviewers	Oct. 7, 2019	Oct. 16, 2019	
4.1 Receive FGP update	Oct. 16, 2019	Oct. 17, 2019	
4.2 Undertake second review by Reviewers	Oct. 20, 2019	Nov. 1, 2019	
5. Presentation to the Board of Examiners	Nov. 4, 2019	Nov. 8, 2019	
5.1 Convening of final review by the Board	Nov. 3, 2019	Nov. 5, 2019	
5.2 FGP completed and submitted	Nov. 8, 2019	Nov. 8, 2019	

Budget
The total budget for the project is US$ 2,116,674 further breakdown will be made
Relevant historical information

The Ecological Christian Organization (ECO) is an indigenous, Non-Government Organization registered in Uganda that is working towards the realization of sustainable livelihoods for marginalized, under-served and vulnerable groups in Uganda. Since its inception in 2005, ECO has implemented a varied portfolio of programmes in the greater Karamoja region, the Albertine rift and the Lake Victoria basin. ECO's current initiatives focus on natural resource governance, climate change adaptation and resilience, and ecosystem management and restoration. ECO has 25 qualified staff on contract both in finance and programmes, with 6 offices and has an operational presence in 10 districts across Uganda.

ECO is a member of the International Union for Conservation of Nature (IUCN), Participatory Ecological Land Use Management (PELUM-Uganda), Climate Action Network – Uganda (CAN-U), Publish What You Pay – Uganda (PWYP-U), Civil Society Coalition on Oil (CSCO), Uganda Water and Sanitation NGO's Network (UWASNET), Uganda Coalition for Sustainable Development (UCSD) and Riamiriam Civil Society Network in Karamoja, among others. ECO's mandate spans the entire country, which, despite its abundant and high quality natural resources has a high proportion of food-insecure people living below the poverty line, and this has contributed significantly towards environmental degradation.

Stakeholders

Direct stakeholders:

- Global School of Project Management, Universidad para la Cooperacion Internacional
- Course Facilitator
- Project Reviewers
- Tutor
- Improved Cook Stoves for East Africa (ICSEA),
- External UN-accredited auditor.
- Mubende Stoves Ltd
- Bread for the World
- 20,000 community beneficiaries in Lake Victoria Basin
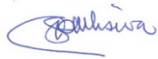
• Ministry of Water and Environment
 	
Indirect stakeholders:
 	
    • Community social structures in Mayuge like; Village Savings and Loans Associations (VSLAs), farmers, women and youth groups and community volunteers
 	
    • Third party Distribution Partners.
 	
    • Academic Assistant
 	
    • PMP classmates

Project Manager: Kabiswa Charles **Signature:**
Authorized by: **Signature**

Appendix 2: FGP WBS

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                         ┌─────────────────┐
                         │ Final Graduation│
                         │ Project         │
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     ┌───────────┬───────────┬────┴──────┬───────────┐
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│Graduation│ │Tutoring │ │Reading  │ │Adjust-  │ │Defense  │
│seminar  │ │process  │ │by       │ │ments    │ │to board │
│         │ │         │ │reviewers│ │         │ │of       │
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1 Graduation seminar	2. Tutoring process	3 Reading by reviewers	4 Adjustments	5 Defense to board of
1.1 Prepare Charter	2.1 Assign Tutor	3.1 Assign Reviewers	4.1 Sent Report to Reviewers	5.1 Final Review by the Board
1.2 FGP WBS	2.2 Commence Tutor	3.2 Commence Review	4.2. Receive FGP update	5.2. FGP completed
1.3 Introduction Chapter	2.3 Tutor approval	3.3 Review approval	4.3 undertake 2nd Review	
1.4 Theoretical Framework				
1.5 Methodological Framework				
1.6 Schedule				
1.7 Summary and Bibliography				
1.8 FGP Project Charter Approval				

Appendix 3: FGP Schedule

FINAL GRADUATION PROJECT DEVELOPMENT SCHEDULE

ID		Task Mode	Task Name	Duration	Start	Finish
1			**Final Graduation Project**	**130 days**	**Mon 5/13/19**	**Fri 11/8/19**
2			FGP Start	0 days	Mon 5/13/19	Mon 5/13/19
3			**1,Graduation Seminar**	**25 days**	**Mon 5/13/19**	**Fri 6/14/19**
4			**1.1,FGP Deliverables**	**20 days**	**Mon 5/13/19**	**Fri 6/7/19**
5			1.1.1,Charter	5 days	Mon 5/13/19	Fri 5/17/19
6			1.1.2,WBS	5 days	Mon 5/13/19	Fri 5/17/19
7			1.1.3,Chapter I. Introduction	5 days	Mon 5/20/19	Fri 5/24/19
8			1.1.4,Chapter II. Theoretical framework	5 days	Mon 5/27/19	Fri 5/31/19
9			1.1.5,Chapter III. Methodological framework	5 days	Mon 6/3/19	Fri 6/7/19
10			**1.1.6,Annexes**	**15 days**	**Mon 5/20/19**	**Fri 6/7/19**
11			1.1.6.1,Bibliography	5 days	Mon 6/3/19	Fri 6/7/19
12			1.1.6.2,Schedule	5 days	Mon 5/20/19	Fri 5/24/19
13			1.2,Graduation Seminar approva	5 days	Mon 6/10/19	Fri 6/14/19
14			**2,Tutoring process**	**65 days**	**Mon 6/17/19**	**Fri 9/13/19**
15			**2.1,Tutor**	**3 days**	**Mon 6/17/19**	**Wed 6/19/19**
16			2.1.1,Tutor assigment	1 day	Mon 6/17/19	Mon 6/17/19
17			2.1.2,Communication	2 days	Tue 6/18/19	Wed 6/19/19
18			2.2,Adjustments of previous chapters (If needed)	5 days	Thu 6/20/19	Wed 6/26/19
19			2.3,Charter IV. Development (Results)	47 days	Thu 6/27/19	Fri 8/30/19
20			2.4,Chapter V. Conclusions	5 days	Mon 9/2/19	Fri 9/6/19
21			2.5,Chapter VI. Recommendatio	5 days	Mon 9/9/19	Fri 9/13/19
22			Tutor approval	0 days	Fri 9/13/19	Fri 9/13/19
23			**3,Reading by reviewers**	**15 days**	**Mon 9/16/19**	**Fri 10/4/19**
24			**3.1,Reviewers assigment reque**	**5 days**	**Mon 9/16/19**	**Fri 9/20/19**
25			3.1.1,Assigment of two reviewers	2 days	Mon 9/16/19	Tue 9/17/19
26			3.1.2,Communication	2 days	Wed 9/18/19	Thu 9/19/19
27			3.1.3,FGP submission to reviewers	1 day	Fri 9/20/19	Fri 9/20/19
28			**3.2,Reviewers work**	**10 days**	**Mon 9/23/19**	**Fri 10/4/19**
29			**3.2.1,Reviewer**	**10 days**	**Mon 9/23/19**	**Fri 10/4/19**
30			3.2.1.1,FGP reading	9 days	Mon 9/23/19	Thu 10/3/19
31			3.2.1.2,Reader 1 report	1 day	Fri 10/4/19	Fri 10/4/19
32			**3.2.2,Reviewer**	**10 days**	**Mon 9/23/19**	**Fri 10/4/19**
33			3.2.2.1,FGP reading	9 days	Mon 9/23/19	Thu 10/3/19
34			3.2.2.2,Reader 2 report	1 day	Fri 10/4/19	Fri 10/4/19
35			**4,Adjustments**	**20 days**	**Mon 10/7/19**	**Fri 11/1/19**
36			4.1,Report for reviewers	9 days	Mon 10/7/19	Thu 10/17/19
37			4.2,FGP update	1 day	Fri 10/18/19	Fri 10/18/19
38			4.3,Second review by reviewers	10 days	Mon 10/21/19	Fri 11/1/19
39			**5,Presentation to Board of Exami**	**5 days**	**Mon 11/4/19**	**Fri 11/8/19**
40			5.1,Final review by board	2 days	Mon 11/4/19	Tue 11/5/19
41			5.2,FGP grade report	3 days	Wed 11/6/19	Fri 11/8/19
42			FGP End	0 days	Fri 11/8/19	Fri 11/8/19

Project: FGP_Schedule Charles
Date: Sun 5/26/19

Task		Inactive Task		Start-only	
Split		Inactive Milestone		Finish-only	
Milestone		Inactive Summary		Deadline	
Summary		Manual Task		Critical	
Project Summary		Duration-only		Critical Split	
External Tasks		Manual Summary Rollup		Progress	
External Milestone		Manual Summary			

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Appendix 4: FGP Philology Letter

November 19, 2019

The Academic Advisor
Masters Degree in Project Management
Universidad para la Cooperacion Internacional (UCI)

Dear Academic Advisor,

Re: Philological review of Final Graduation Project submitted by Kabiswa Charles in partial fulfilment of the requirements for the Masters in Project Management (MPM) Degree

Comments: Reformatted to ensure consistent fonts, alignment and size. Titling aligned and consistent. Table of contents, list of figures, list of tables improved. Table formats improved to ensure proper alignment and ease of reference. Grammar and syntax checked and proofread. Some comments were made in text such as; need to reference tables/figures in text, some tables were too lengthy, referencing style not consistent.

The papers' strength lies in the structure, outline and formatting and adherence to these throughout the document. Considering the changes made, the project is ready to be presented.

Faithfully,

Kansiime K. Monica PhD
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CABI Africa
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