

## ACE CLIMATE SABC – HARAMAYA UNIVERSITY IMPLEMENTATION COMPLETION REPORT (ICR)



November, 2023  
Haramaya, Ethiopia

## **PREAMBLE AND ACKNOWLEDGEMENT**

We, the project team at Africa Center of Excellence for Climate Smart Agriculture and Biodiversity Conservation (ACE Climate SABC), are glad to reach at the stage of the preparing the project implementation completion report in which we have tried provide the result chain, project context and development objectives, key outcomes of the project, key factors that have affected the preparation and implementation and the project outcomes, and key lessons learnt during the implementation and recommendations for future projects. We have also annexed the updated results framework, DLRs disbursement matrix, contracts register, beneficiaries' matrix, and the summary of major innovations or knowledge transferred through students' research and scientific conference organized by the Center in the report.

The Center was established with the competitive grant obtained from the world Bank and started its operation in October 2017. We are grateful to the World Bank for providing the funding and for its close follow up during the implementation of the project. We also thank the Ministry of Education and Ministry of Finance of the Federal Democratic Republic of Ethiopia for their willingness and facilitation of the loan grant. The coordination role played by the Inter-University Council of East Africa (IUCEA) was instrumental for the successful implementation of the project. Technopolis, the verifying agency, has also played an important role by providing independent verification of results achieved by the Center which is the prerequisite for the disbursement of the project fund. The Center could not achieve all verified and unverified results without the unreserved support received from the national and regional streeting committees, the National Bank of Ethiopia, the management of the host university, and other stakeholders.

# 1. Results Chain

Figure 1: Results Chain

		INDICATORS
<b>Impact</b>	<ul style="list-style-type: none"> <li>• Homegrown solutions for the region’s social and economic development challenges.</li> <li>• Reduction in skills shortage in STEM (Agriculture, health, statistics) and increased productivity of priority sectors.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed human capital in climate smart agriculture and biodiversity conservation; collated several climate smart agricultural and biodiversity conservation practices through PhD and MSc Research projects for dissemination.</li> <li>• Students’ satisfaction rate (above 90%)</li> </ul>
<b>Outcomes/PDO</b>	<ul style="list-style-type: none"> <li>• Increased regional specialization to address development challenges.               <ul style="list-style-type: none"> <li>○ Increased number of new specialized programs in priority sectors</li> <li>○ Increased number of national and regional students enrolled in new specialized short-term courses, and master and PhD programs.</li> </ul> </li> <li>• Strengthened capacity of institutions to deliver quality training and research.               <ul style="list-style-type: none"> <li>○ Increased number of internationally accredited education programs in priority sectors</li> <li>○ Increased enrolment in STEM related academic programs.</li> <li>○ Increased number (and/or retention) of qualified faculty.</li> <li>○ Increased quality of research in priority sectors.</li> <li>○ Increased amount of externally generated revenue by the ACEs.</li> <li>○ Increased compliance with international benchmarks for quality education.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Total of 43 (15 PhD and 28 MSc) students enrolled.</li> <li>• Two MSc and one PhD programs</li> <li>• Shares of regional students enrolled are: 25% for PhD program; 23% for MSc in Climate Smart and 31% for MSc in Biodiversity and Ecosystem Management. Overall share of regional students’ enrolment is 26%.</li> <li>• 95% PhD holders for master’s and PhD Programme.</li> <li>• Timely graduation rate (80% of masters students and 50% PhD students who successful finished their programme as a proportion of the cohort that enrolled).</li> <li>• All MSc students that completed the coursework conducted their internship in relevant world of work.</li> <li>• Staff/student exchange for teaching, research and short-term training; joint course delivery and research supervision; effective implementation the PASET-RSIF PhD program; joint grant proposal development; co-financing of international conference; joint publication on reputable journals</li> </ul>

**Figure 1: Results Chain**

**INDICATORS**

**Results**



- Globally competitive postgraduate programs
- Enhanced capacity to deliver regional high-quality training.
- Increased industry/sector partnerships.
- Increased regional and international academic partnerships.
- Enhanced governance and management of the ACE/university systems.
- International evaluation and accreditation of quality of education programs.
- Published articles in internationally recognized and peer reviewed journals.

- 14 PhD, 43 MSc in Climate Smart Agriculture, and 32 MSc in Biodiversity and Ecosystem Management graduated
- Total of 360 trainees benefited from seven different types of short-term trainings
- A total revenue of close to 4.0 million generated from different sources
- Enhance capacity of laboratories, established smart classrooms, state-of-the-art video conferencing facilities, well-furnished accommodation for students; well-furnished offices for staff and PhD students.
- Program self-Assessment report for international accreditation of programs
- Benchmarking of the Haramaya University
- Became one of the African Host Universities (AHUs) for the PASET-RSIF PhD scholarship
- Over 100 publications by Center students on peer reviewed high impact journals

**Activities**



- Improve learning resources, including lab equipment, and minor rehabilitation/extension of existing facilities.
- Revising curricula of existing programs to meet the development challenges.
- Meet international benchmarks for quality education (e.g., benchmarking of Haramaya University).
- Deliver seven different short-term courses for professionals.
- Facilitated students' internship in the real work world.
- Networking activities with national and international partners.
- Joint delivery of courses, research supervision and conferences.
- Faculty exchanges/visiting faculty.
- Conducting employers' and graduates' surveys for tracer study.
- Administration, fiduciary management (including financial management (FM), procurement, oversight, and capacity),



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**Figure 1: Results Chain****INDICATORS**

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transparency.

- Developing and running Center's website
  - Procurement of vehicles, office/classroom/residence/videoconferencing/laboratory equipment, furniture and fixture
  - Data gathering and organization for university benchmarking
  - Conducting mid-term evaluation
  - Organizing international conference
  - Facilitating several staff/PhD student exchange programs
  - Facilitating internships for MSc students
  - Generation of external resources.
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## **2. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES**

Climate change is a worldwide challenge posing threats to the survival of mankind and hindering sustainable development. The Intergovernmental Panel on Climate Change (IPCC, 2007) reported that the whole of Africa is likely to warm during this century at a rate faster than the global average, with the drier subtropical regions warming more than the moist tropics. Climate change is already imposing a significant challenge to Eastern and Southern African countries by causing natural resources and biodiversity degradation and subsequently affecting food security, water and energy supply, poverty reduction and sustainable development. These countries have contributed the least to the problem, but highly susceptible to the impacts of climate change. They are also the least to cope up with climate change and the associated hazards, since the adaptive capacity of their socio-economic systems is lower compared to other African regions.

The Eastern and Southern African region is 'highly vulnerable' to the impacts of climate change because of the over-dependence on climate sensitive sectors such as rain-fed agriculture, forestry and water resources. Agriculture is a major contributor to the national economies of the countries in eastern and southern Africa region. Among the countries in the region: Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, and Zambia, on average agriculture accounts for 21–42% of the national gross domestic products. Both crop and livestock production in Africa are severely constrained by climate change and associated problems as a result of which productivity is low. Constraints to crop production in Africa have been described to include: a) frequent droughts; b) rampant crop and livestock diseases; c) land degradation; d) declining soil fertility; e) lack of access to quality seed/fertilizers; f) poor technology transfer mechanisms; g) lack of risk aversion mechanisms; h) poor market access; i) issues of land use and population density; j) and poor management of soil and water resources. Similarly, climate change also constrains livestock production in SSA. The main constraints to livestock production include low productivity of local breeds, seasonal feed scarcity and poor feed quality, declining grazing land, and limited access to water, poor soil health and land

degradation, erratic rainfall patterns, low or absence of protection against diseases, poor knowledge and skill transfer systems, and lack of market access.

Climate change has also been causing extinction of species and reduction in biodiversity. Global average surface temperature increases of 2°C could commit about 15-40% of species to extinction. Climate change has increased desertification in tropical regions. Currently, two-thirds of Africa is desert or dryland, a situation that is going to be aggravated by climate change. The loss of biodiversity has inevitable risks and costs to agricultural productivity and food security. By 2085, Africa is expected to lose between 25 and 42% of the species' habitats. The Eastern and Southern African countries have highly variable climates that make these regions highly sensitive to small changes in the global climate and cause biodiversity loss. Loss of biodiversity limits coping and adaptation options in the face of climate change. For example, due to a variety of causes, Kenya is estimated to have lost 10 percent of its plant species in the past century and similar trends have been observed in other eastern and southern African countries.

There are clear evidences that the conventional agricultural production system of eastern and southern African regions failed to cope up with the impact of climate change on livelihoods, food security and biodiversity which is aggravated by anthropogenic factors. Climate smart agriculture (CSA) is an approach to develop the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change. This approach can strengthen livelihoods and food security, especially of smallholders, by improving the management and use of natural resources and adopting appropriate methods and technologies for the production, processing and marketing of agricultural goods. CSA supports countries in putting in place the necessary policy, technical and financial means to mainstream climate change considerations into agricultural sectors and provide a basis for operationalizing sustainable agricultural development under changing conditions.

Available knowledge points to the fact that Africa is one of the most vulnerable regions to climate change, yet higher education institutions capacity development is limited in training and scientific research on climate change and biodiversity. A survey conducted in 2007 to

evaluate how plant genetic resources and biodiversity are being taught in universities of Zimbabwe, Malawi, Zambia and Uganda indicated that none of the surveyed universities offered comprehensive biodiversity program at the undergraduate or graduate level. Therefore, it is necessary to develop new specialized training programs or re-orient curricula that integrate climate change scenarios as well as its adaptation and mitigation strategies.

Ethiopia and other countries in the Eastern and Southern African region are large and densely populated, particularly in the highlands. For example, the landscape of most of the countries in this region is characterized by markedly diverse ecosystems, culture, climate, agriculture, biodiversity, and high socio-economic dependence in its land resources. As a result, the land has been under great pressure with the natural resources of the native ecologies severely depleted. Productivity is generally low, but has been exacerbated by persistent drought and extreme weather variability. Thus, agriculture has been designated as one of six 'green economy' sectors included in the Climate Resilient Green Economy (CRGE) strategy of Ethiopia.

Countries in the Eastern and Southern African region have experienced severe weather variability, crop failure, and recurrent famine throughout their histories. The countries are also endowed with a wealth of biodiversity. For example, Ethiopia is the globally recognized center of origin and diversity of many important crops including coffee, sorghum, minor millets, barley, durum wheat, and several others. Countries in Eastern and Southern African region also lead the continent in the number of livestock (cattle) and rank high in numbers of camels, sheep and goats as well. Countries so rich in biodiversity would need greater awareness for managing their natural resources, to slow down the loss of biodiversity and degradation of the greater ecological environment. A new integrated approach needs to be advanced to improve and manage crops and livestock, as well as the soil, land, and ecological resources of the region.

The policy climate for science-based development in countries of Eastern and Southern African region is highly encouraging. The governments of Ethiopia, Kenya, Tanzania, Rwanda, Mozambique, Zimbabwe, Malawi, Rwanda, and Zambia heavily support the vital national institutions for technology generation and deployment, including higher education, agricultural research, and the extension services. For instance, the accelerated expansion of tertiary

education in the last 10 years in these countries is unparalleled. For example, local financial support for agricultural research and extension services in Ethiopia is unmatched by any other country in Africa. The large cadre of over 60,000 extension agents and a network of farmer training services are exemplary, even with the limited technical and support resources available. The research culture and discipline among professionals are very good. Unfortunately, there is huge attrition of staff at many of these institutions, denying the countries the chance to develop more mature institutions for development and deployment of agricultural technologies.

With increased awareness, rural communities in this sub-region are opening up to scientific interventions, demanding improvements in both crop and livestock management practices, including new crop varieties, supply of agricultural inputs, new technologies to increase production, reduce pre-and-post-harvest losses, and new value-added products that lead to higher incomes. However, the region faces a shortage of highly skilled professionals with specialized knowledge who can innovate and boost productivity in these areas.

The higher education sector in Eastern and Southern African (ESA) faces severe constraints in terms of producing a critical mass of graduates to meet regional development needs. Despite recent rapid expansion in higher education enrollment in the region, comparatively, ESA countries have a long way to go and compare unfavorably with other regions (1 percent in Zambia and 5 percent in Ethiopia, Malawi, Mozambique, and Rwanda).<sup>12</sup> Female enrollment rates are even lower with rates of just 1 percent in Malawi and Ethiopia, 13 well below the world average of 7 percent. Overall, the ESA region produces low numbers of graduates in science, health, agriculture and engineering with less than 30 percent of graduates majoring in these fields.

Students enrollment at sub-Saharan universities increased dramatically from fewer than 200,000 in 1970s to about 4.8 million in 2008. The current estimate of tertiary education enrollment in Sub-Saharan Africa is 10 million students. However, during that same period, the number and quality of research and publications as well as the quality of education have declined in Africa from the year 1980s onwards due to a combination of shortage of research

fund [for example: research funds compared to GDP (Ethiopia 0.24%, Kenya 0.48%, Malawi 1.7%, Tanzania 0.48%, and Uganda (1.1%) (2010 R&D Survey), poorly equipped teaching and research facilities, flight of qualified and skilled faculty from universities due to low salaries, and high teaching loads.

Despite the expansion of higher education in countries in this region of Africa, the quality, relevance, and accountability of the education are at stake. The region suffers not only from inadequate number of graduates, but also low quality and relevance of their education and training. Thus, staff qualification has not improved much. Very few staff members have PhDs. It is estimated that only about 100 PhDs are produced by higher education institutions across 31 countries in SSA in science, technology and engineering. What is more, institutions do not have the resources to attract top quality staff, nor are they able to provide staff support with research facilities.

Research outputs are also low in countries in the sub-region. SSA contributes less than 2 percent of the global research output and just 0.1 percent of patents (WB & Elsevier, 2015). From 2005-12, Ethiopia acquired only one patent and Kenya acquired 29. The region also produces the lowest number of scientific researchers in the world. For example, Rwanda, Malawi, Uganda and Zambia produce only 54, 123, 83 and 49 researchers per million inhabitants respectively. In comparison, Malaysia and Thailand produce 1,780 and 546 researchers per million inhabitants.

Higher education in Eastern and Southern African region is also undermined by the slow pace of development of staff in capacity and qualification. For example, in Kenya, 290 doctorates graduated in 2013, while tertiary enrollment expanded by 80,000. Even assuming full employment of all new PhD holders, the ratio of newly qualified faculty to new students was 1:275. For high quality research, it is important to train students at Master's and PhD levels. Less than 15 percent of staff in universities in Ethiopia, Kenya, Mozambique and Rwanda holds PhD degrees. Even flagship universities, such as Addis Ababa University in Ethiopia and the University of Malawi in Malawi, employ only about 20-25 percent of staff with PhDs.

Most of the research outputs in countries in Eastern and Southern Africa are produced with international (non-African) collaborations. For example, only 30 percent of publications in Eastern Africa and 20 percent in Southern Africa are the result of national and/or regional collaborations. This shows that most of the research agenda is often set by the international partner(s) rather than be originated for and oriented to alleviating local development challenges.

Producing graduates who are not able to do first-rate research will continue the downward cycle of higher education. Furthermore, research collaboration, which catalysis innovative research and human capital development, is low in the Eastern and Southern Africa region. Research collaborations within and between African universities and with their counterparts in the developed world, are essential to productive research and human capital development, remain low. Therefore, agricultural graduates from higher education institutions in eastern and southern African countries are not only limited in number, but also not sufficiently equipped with knowledge and skills required to effectively address development challenges.

The opportunity to combine graduate education with an enhanced research capability for strengthening the research capacity of agricultural institutions in the Eastern and Southern Africa region through this project is one that caught our interest and raised our hopes. Building the capability to produce badly needed human capacity with relevant education and skills, the strengthening of functional institutions across the agricultural development impact pathway to create and dispense (or to adapt and scale out) practical and useful technologies is a must to have for developing nations. Countries in the eastern and southern African region have made immense progress in meeting several of their 'Millennium Development' goals. As these countries prepare to take on the revised United Nations charge of meeting the new 'Sustainable Development' goals including (SDG#2 to end hunger, achieve food security, and improve nutrition and health and encourage sustainable agriculture), an enhanced human and institutional capital will be needed.

Investment in post-graduate education generates highly skilled human capital that can serve academic and research institutions. Enhanced human capital is central to the development of

much-needed, locally relevant scientific knowledge and technology to tackle major development challenges. The eastern and southern African countries have invested heavily in education since the 1970s. These countries have also drawn favorable policies for expanding higher education, albeit the high costs of quality education. With the help from the World Bank, Ethiopia embarked on a major program to expand access to higher education, including expansion of the graduate programs.

With the backdrop of the above narrative on the challenges and the deficiencies in the higher education systems of countries in Eastern and Southern African region, the opportunity to submit an application in response to the request for proposal from the World Bank, through ‘the Eastern and Southern Africa Higher Education Centers of Excellence ACE II’ project, is very exciting and provides unique avenues for Haramaya University. We propose to establish an ‘African Center of Excellence for Climate Smart Agriculture and Biodiversity Conservation’. We believe that ‘climate smart agriculture’ offers a great potential to increase sustainable productivity and resilient farming systems to climate effects, and mitigate impacts of climate change through greenhouse gas emission reductions and carbon sequestration. For the purposes of this project proposal, we define ‘climate smart agriculture’ as innovative production systems that integrate crop and livestock genetic improvement with management practices that increase productivity in a changing climate, while enhancing the socio-economic and environmental sustainability of the agricultural landscape and the natural resource system ecology in the Eastern and Southern African region. It specifically embodies soil and nutrient management, water capture and use, pest and disease control, resilient ecosystem, genetic resources, integration of livestock-crop production, harvesting, processing, and supply chains. It also suggests a mix of smallholder agriculture with large scale production systems where the land, water, and prevailing infrastructure would make them feasible.

### Project Objectives

The general objective of the project (i.e., establishing the Africa Center of Excellence for Climate Smart Agriculture and Biodiversity Conservation - ACE Climate SABC) was to improve the quality of postgraduate education and research in eastern and Southern Africa to foster enhanced



capacity to adapt and mitigate effects of climate change and weather variability, and ensure biodiversity conservation more effectively in the region.

The specific objectives of the project are:

- Produce skilled MSc and PhD graduates in ‘climate smart agriculture and biodiversity conservation’ that can address current and emerging developmental challenges under changing climate.
- Generate new knowledge and promote technological innovations through quality research to address national and regional development challenges.
- Enhance knowledge, skills and scholarship and research culture of faculty and technical personnel at universities to lead a more effective, result-oriented, and high-quality post-graduate training with cutting edge research.
- Upgrade teaching and research facilities (laboratories, ICT services, greenhouses, lath houses, meteorological stations, research farms, etc.).
- Strengthen national, regional, and international collaborations and partnerships to enhance exchange of science and technology skills, experience, and expertise.
- Foster specialization in specific areas of excellence and collaboration with emerging higher education institutions.
- Establish a program for continued funding to sustain high quality postgraduate training and cutting-edge research in climate smart agriculture and biodiversity conservation in the region.

### **3. SIGNIFICANT CHANGES DURING IMPLEMENTATION**

There were no significant changes in the scope, PDO and outcome targets of the project as such during the implementation. However, the outbreak of the Covid pandemic has caused a delay in the completion of activities of the project such as the procurement of goods, works and services, delivery of course and short-term trainings, data collection which ultimately resulted in the delay of timely completion of studies and lowering of the graduation rate. The delay of timely completion of activities has also resulted in additional costs of completion of activities,

since this situation has forced the Center to pay extra stipends and to compensate for price inflation on research inputs.

#### **4. OUTCOMES**

At ACE Climate SABC, several Climate Smart Agriculture (CSA) and biodiversity conservation technologies and practices have been generated or identified, validated and documented through several completed postgraduate students' research in different countries in the eastern and Southern Africa region over the last four-five years. The Center has forged collaborative partnerships with national, regional and international (12 MOUs were signed) to promote learning and research excellence. The Center has also contributed to capacity building efforts in the eastern and Southern Africa region by producing highly qualified graduates (12 PhDs and 67 Masters) in the areas of climate smart agriculture and biodiversity conservation. The research results of the graduates contribute to the improvement of the livelihoods of the societies in the region. The research also contributes to the development of knowledge and technologies. Implementing the project has also made significant contributions to the enhancement of the physical capacity of the center and the university such as smart classrooms, office furniture and equipment, videoconferencing facilities, laboratory and meteorological station equipment, residential house furniture, and agroecology and climate smart agriculture research hub.

Through its educational and research actions, ACE Climate SABC contributed to SDGs goals such as ending poverty (Goal#1), ending hunger (Goal#2), promoting wellbeing (Goal#3), inclusive and equitable quality education (Goal#4), gender equality (Goal#5), economic growth (Goal#8), sustainable production and consumption (Goal#12), Climate change (Goal#13), conserve water resources (Goal#14), ecosystem conservation (Goal#15), and partnership for sustainable development (Goal#17). The Center has also contributed to the attainment of Agenda 2063, the Africa we want, such as inclusive growth and sustainable development (Aspiration#1), an integrated continent (Aspiration#2), shared values and ethics (Aspiration#5), people driven development (Aspiration#6), and influential Africa in global arena (Aspiration#7).

The programs (one PhD in Climate Smart Agriculture and Biodiversity Management and two MSC programs - one in Climate Smart Agriculture and another in Biodiversity and Ecosystem Management) developed at the Center have increased regional specialization to address current development challenges caused by climate change and biodiversity loss. Since its establishment, the Center has enrolled 43 regional students of which 15 are PhD and 28 are masters. The enrolment of the regional students at the center has made a significant stride towards the internationalization of the University.

Being the regional hub in the areas of climate change, ACE Climate SABC was selected to host PhD scholars under the Partnership for Skills in Applied Sciences, Engineering and Technology (PASET) - Regional Scholarship Innovation Fund (RSIF) program, regional research initiative. As a result, I selected Haramaya University as one of Africa Host Universities (AHUs) for the program. The Center has so far enrolled eight PhD students in two cohorts. The first cohort students are on their research works while second cohort students are doing coursework.

From the outset, the Center developed quality curricula through effective engagement of the stakeholders and validation at the international level by involving renowned scholars from advanced knowledge centers. The curricula were nationally accredited and presently the self-assessment report (SAR) for the curricula is completed for submission for international accreditation. In addition, the revision of the curricula is underway including feedback obtained from different stakeholders and the latest developments in the areas of the program.

Moreover, ACE Climate SABC has facilitated the participation of the Haramaya University in the PASET benchmarking initiative of the World Bank in which the University compiled and provided 100% of the required data for the institutional performance indicators and 95% for institutional health indicators. The benchmarking exercise surely enhanced the reliability of the university at regional and international levels. The benchmarking report can also serve as a tool that shows the strengths to capitalize on and the weaknesses to tackle.

The Center organized seven skill-enhancer short-term training programs during the project period from which a total of 400 trainees have benefited. The training programs are: Integrated

Decision Support Systems; Food security, Climate Change and Modeling; Green House Gas (GHG) Emission Measurement and Mitigation Strategies; Eco-friendly Landscape and Waste Management; Digital and Information Literacy and Research tools; Scientific Writing and Research Methods; and Predicting and Projecting Climate Change and Variability. The trainees include students of the Center and the University, staff members of different institutions, and employees of various organizations. In terms of making impacts, for instance, the training programs have enhanced the research, scientific writing and communications, data retrieval and management skills of the trainees, particularly of the students who were able to produce high-quality research outputs.

Another key outcome of the Center is the collaborative partnerships it formed with national, regional and international institutions and organization, both private and public. The networking formed through these partnerships enabled the Center to mobilize resources, capabilities and competences that are instrumental to ensure learning and research excellence.

During the implementation phase, efforts were made to generate revenue from external sources. Grant winning proposals were developed by the project team members, affiliates staff members of the university and scholars from partner institutions to fund joint and complementary projects. Accordingly, a total of 3.9 million USD was generated from various sources such as EU Academic Mobility grants, PASET-RSIF, Merit-NORHED II, InnovAfrica, Hakim Gara Rehabilitation, PhD Project with Natural Resource Institute (NRI) of the University of Greenwich (UoG), Participatory Action Research in Climate Change by the Development Innovation Fund (DIF), and from other sources.

Regarding linkage with industry, the Center established partnerships with industries to collaborate on capacity building training, joint research, and student staff exchange. Towards this end, the Center signed MoUs with two private sector organizations (i.e. Harar Brewery, the subsidiary of Heineken Group and Aqua-Soul, Mineral Water Factory). Moreover, the curriculum of the MSc programs of the Center requires the student to stay at industries for a minimum of three months for internship. Accordingly, a total of 85 (51 from Climate Smart Agriculture and 34 from Biodiversity and Ecosystem Management programs) have been

attached to industries for their internship. They have also shared the experience gained from the internship to their fellow students through oral presentations of their reports.

The management system of ACE Climate SABC is less bureaucratic and hence most of the decisions are made without unnecessary delays. The practice of producing performance reports every quarter of the year can be considered as a good practice to benchmark as it ensures effective monitoring of the progresses made during program implementation.

In order to ensure research excellence, the Center has developed a research thematic area guideline and a strong research management system. Students are guided to identify their topics within the thematic areas and closely supervised while developing their proposals. Once carefully developed, proposals are critically reviewed by subject area experts identified by the Training and Research Head of the Center in consultation with the advisors. Then the proposal will be defended by the student in the presence of the reviewers and the advisors and commented for further improvement so that it can guide the student to conduct quality research.

The Center has organized well furnished office and residential spaces with Internet connectivity, refurbished laboratories, and facilitates the assignment of qualified and experienced advisors to enable the student to conduct quality research. Best climate smart Agriculture and biodiversity conservation knowledge, practices, and technologies have been identified, evaluated, generated and recommended for use by the end users.

ACE Climate SABC attributed several benefits to each of the seven categories of beneficiaries as explained below.

- a) Students of the Center have benefited from high-quality training and research that were guided by outcome-driven, relevant, current, forward-looking, flexible and inclusive curricula; course delivery and research supervision conducted by senior professors of the host university in joint collaboration with seasoned scholars coming from national, regional and international partner institutions; skill-enhancing short-courses; training

and/or research exchange programs; internships; and cultural, experience, and knowledge exchange among students coming from different countries.

- b) Haramaya University benefited from the implementation of the project in terms of increased visibility at regional and international levels by hosting regional students and inviting scholars from regional and international institutions; enhanced partnerships and networking for future collaborations; complementarity of the project with other programs of the university; getting benchmarked was an enabler for the university to know its strengths to capitalize on and weakness to overcome; overall capacity building (human, physical, financial).
- c) Employers have benefited from improved performance; established networking through graduates; enhanced capacity to tackle climate change induced risks; reduced cost of training the employees;
- d) The communities in the region benefited from the students' research outputs like best climate smart agricultural practices, biodiversity conservation mechanisms, technologies that can be taken up to improve their resilience to climate change induced challenges.
- e) Faculty and support staff of the university benefited from the implemented project through joint course delivery, research supervision, publication, teach and research exchange, conference participation, networking, joint new project development, experience sharing,
- f) Regional institutions benefited from the implemented project as it created a platform for experience sharing (for example TAM), capacity building through staff/student exchange programs,
- g) Faculty and students in STEM and other priority sector disciplinary areas have benefited from exchange visits, collaborative teaching and research and other knowledge sharing activities facilitated as ACE Climate SABC.

To be specific, the following are the benefits brought by ACE Climate SABC project.

- 14 PhD, 43 MSc in Climate Smart Agriculture, and 32 MSc in Biodiversity and Ecosystem Management graduated

- Total of 360 trainees benefited from seven different short-term trainings
- A total revenue of close to 4.0 million generated from different sources
- Enhance capacity of laboratories, established smart classrooms, state-of-the-art videoconferencing facilities, well-furnished accommodation for students; well-furnished offices for staff and PhD students.
- Program self-Assessment report for international accreditation of programs
- Benchmarking of the Haramaya University
- Became one of the African Host Universities (AHUs) for the PASET-RSIF PhD scholarship
- Over 100 publications by Center students on peer-reviewed high impact journals

Some of the unintended benefits of ACE climate SABC include:

The Center has exceeded its intended targets in many activities including the enrolment rate of both PhD and MSc students, the number of training beneficiaries; the number of articles published, the number of partnerships forged, number of female students enrolled, and number of resources mobilized (external revenue generation). The Center's networking status with different institutions and scholars has been enhanced thereby resulting in more interest and motivation to work together, especially in the development of joint projects. The University's visibility has also been enhanced.

In terms of DLRs achievements, there were challenged towards the beginning of the project periods due to lack of experience to compile reports for verification. However, the achievement of DLRs has shown progressive improvements over periods and currently it stands at 90%. The fund utilization rate at the Center was behind the plan because of several hindrances like the outbreak of the COVID-19 pandemic, the lengthy foreign procurement process, the high staff turnover at the Center, the challenge fund transfer for regional students when they are in their respective home countries to conduct their research.

For effective implementation of the project activities, ACE Climate SABC has been procuring goods, works and services from both local and foreign sources. Among the major services procured are the transportation and hotel accommodation services for visiting scholars coming to the Center for course delivery, conference and seminar attendance, students' supervision,

and to serve as a member of the Board of Examiners during dissertation and thesis examinations. The provision of these services was quite smooth and efficient since they provided under contractual agreement with the service providers (the Ethiopian Airlines and some hotels in Dire Dawa and Harar cities). However, foreign purchases and transfer of research fund for regional students for the procurement of materials required for their research are always sluggish because of the shortage of the hard currency at the Central Bank of the country.



Pictures taken during visits of partners



Delegates from NRI of University of Greenwich (UoG), an International Partner Institute



Prof Gebisa Ejeta, World Food Laureate, providing short-course on Food Security



Delegate of IUCEA, the World Bank, and other partners during their Visit at the Center



Delegate of Amoud University, Regional Partner and FAO Representatives for Somalia during their Visit at the Center

Pictures taken during some short-term trainings



Training on Decision Support Systems



Training on Information and Digital Literacy



Training on Environmental and Social Safeguard: Ecofriendly landscaping and Waste Management



Training on GHG Emission Measurement and Mitigation Strategies



## Pictures of some key Resources



Afran Kello Building Where ACE Climate SABC is Hosted



The Africa Village Where Regional Students Reside



Well-furnished Smart Classroom's for Lectures and Writing Exams



State-of-the-Art Videoconferencing facilities

Pictures taken during graduation ceremonies



Some of the female MSc graduates of the Center



Some the PhD and MSc graduates of the Center



ACE Climate SABC at the Grand Convocation Ceremony of the University



Graduation Trophies for PhD Graduates of the Center



Pictures taken during field visits or work



ACE Climate SABC while on practical field visit



ACE Climate SABC while on practical field visit



Tigist, PhD student of the Center, with her supervisor on her research field



Fikir, a PhD student of the Center, while working on her research field

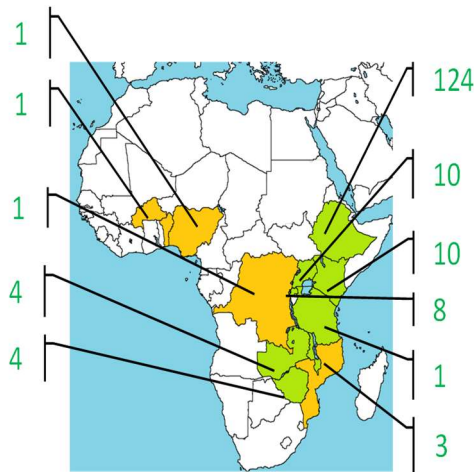
## Pictures of Some Center Students



Some of first Cohort Students



Newly admitted students while taking orientations



Map showing countries of students of the Center



First Cohort PASET-RSIF sponsored PhD students



Knowledge Dissemination Workshop on, “Transforming Food Systems in Africa through Climate Smart Agriculture - October 28-30, 2022”



Conference Book of Abstracts



Conference Participants



Keynote speakers



Conference facilitators

## **5. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOMES**

During the proposal development, mobilizing the project team out of their busy schedule to work on the proposal development was a challenge. However, it was managed through sharing tasks, and meeting during weekends and off hours. Towards the beginning of the project implementation, there were issues with ownership of the project by the university community. This was, however, partly resolved through continuous awareness creation and formulation of inclusive packages including incentives. Other issues during the initial implementation phase of the project were securing offices, classrooms, and students' residential places. However, thanks to the University's top management, the problem was overcome by allocating facilities that were constructed for other purposes. Accordingly, the Center was given offices and classrooms at the Afran Kallo building where it is still functioning. Apartments that were constructed for academic staff were allocated as residences for the regional students. The other problem during the preparation phase was getting a budget for procurement of items to furnish the offices, classrooms, and students' residences. This was however, resolved in consultation with the university's top management where the Center was allowed to use the regular budget of the university to procure the required items. In addition, due to the slow achievements of DLRs towards the beginning of the project phase, the Center was running short of budget which was later rectified by working hard towards achieving more DLRs.

The COVID-19 pandemic was among the key factors that affected the implementation and outcome of the project. The precautionary measures imposed following the outbreak of the pandemic have affected some of the critical activities like face-to-face delivery of courses and short-term training, students' travel and collection of data for their research, and led even to the cancellation of some short-term training programs jointly scheduled with professors in partner institutions. To overcome the challenges caused by the pandemic, the Center put in place the recommended precautionary measures and also opted for the use of virtual platforms for course delivery and presentation and review of proposals.

The other factor that hugely affected the timely implementation of the activities of the project was the turnover of the project staff. Four persons have taken turns on the position of the



Finance Officer, three on the position of the Training and Research Head, two on the position of Project Manager, and two on the position of Communication Officer which is presently vacant. Whenever a leader, a manager or an officer leaves a position, it has a significant impact on the smooth flow of activities as it requires a good amount of time to select and induce a new person to the vacated position.

## **6. ENVIRONMENTAL AND SOCIAL SAFEGUARDS COMPLIANCE**

Even though, the project has limited or minimal civil works that have impact on the environment, ACE Climate SABC has assigned an Environmental and Social Safeguard (E&SS) Officer from the outset and the Officer has been closely working with the Center on mitigation measures. The Center's Management and staff in general and the Officer in particular oversee whether all activities (learning-teaching, research, staff/student exchange, short-courses, partnership for excellence) at the Center are performed in manners that ensure environmental and social safeguarding and mitigation measures. The center considers environmental and social safeguard issues in to account while procuring goods, works and services. Moreover, the Center provided short-term training on environmental and social safeguards (i.e. eco-friendly landscape and waste management) to trainees coming from different institutions and organizations including those working in the environment protection bureaus of the government. In addition, students of the Center are always encouraged to consider environmental and social safeguard issues in their research. The students and staff of the Center also actively engage in the Green Legacy Initiative of the government of Ethiopia through planting tree seedlings.

When it comes to the Grievance redress mechanism, the Center has adopted that of the University as stipulated in the Senate Legislation, students' Codes of Conduct, Staff Codes of Conduct, Anti-Sexual Harassment Policy, and Postgraduate Supervision Guidelines. Some grievances reported to the center by the students towards the beginning of the implementation period were related to the delay in the transfer of stipends and research funds for the regional students during their stay in their respective home countries for research works, the outage of

power, interruption Internet connectivity and water supply. However, the center has taken corrective measures and there are no issues causing any grievance and complaint by the students of the Center.

## **1. LESSONS AND RECOMMENDATIONS**

- a) Running regional programs creates opportunities for joint course delivery, research, student supervision and publication for the faculty members of Haramaya University and different national, regional and international institutions which increases the quality of education and research which ultimately improves the visibility of the institutions. Thus, operating regional programs contributes towards addressing regional development challenges through integrated efforts.
- b) Working in partnership with different stakeholders throughout the project development and implementation processes contributes towards effective implementation of projects. It enhances the quality of the outputs through sharing resources, experiences and capacities to create competences. Partnerships also help to build confidence among the parties. Thus, there is a need to maintain and extend partnerships in the future for better performance and pronounced impact.
- c) The fact that regional students come from different countries and attend classes together enhances culture and best practices exchanges, builds confidence of the students, and leaves a foundation for future collaborations.
- d) Linking the students to industries for internship is quite useful to enhance the practical skills of the students and widen employment opportunities for them. The industries also benefit a lot from the internship during as the students share from the theoretical knowledge gained from the coursework in the classrooms.
- e) There is a high demand for climate smart agriculture and biodiversity conservation programs. Given the timeliness and importance of the program and the limited number

of human capital in the areas of climate change in the Eastern and Southern Africa region, there is a dire need to invest in capacity building in these areas.

- f) The lengthy and sluggish foreign procurement procedures have affected the timely execution of project activities. Hence, there is a need to negotiate with concern bodies for procurement policy relaxation. There is also a need to start the procurement process well ahead of time to ensure timely delivery of the procured items.
- g) The transfer of stipends and research funds for regional students while they are in their home countries to conduct research is always a challenge as the Central Bank takes long time to make the transfer. This has caused a significant impact on the timely completion of the study by the regional students. Thus, there is a need to negotiate with Bank officials to give such request a priority.
- h) The regular monitoring and evaluation of project activities being practiced at the Center enabled to track the implementation progress of projects and take adjustments whenever required. This practice can be taken up by other units of the university and any interested centers and institutions.

## 7. ANNEXES

### Annex - I

#### ACE Climate SABC - Haramaya University Results Framework and Key Outputs

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion	
					Self-Reported	Verified
Regional Masters students (Total)	Number	-	20	20	28	
Regional Masters students (Female)	Number	-	4	4	17	
Regional PhD students (Total)	Number	-	7	7	15	
Regional PhD Students (Female)	Number	-	2	2	4	
Regional students attended short-term courses (Total)	Number	-	66	66	43	
Regional students attended short-term courses (Females)	Number	-	13	13	21	
Total Masters students (national and regional)	Number	-	80	80	108	
Total female Masters students (national and regional)	Number	-	20	20	43	
Total PhD students (national and regional)	Number	-	30	30	59	
Total female PhD students (national and regional)	Number	-	10	10	15	
Total students attended short-term courses (national and regional)	Number	-	168	168	400	
Short-term courses (Female)	Number	-	56	56	80	
MOUs on partnerships for collaboration in applied research and training entered into by the ACEs	Number	-	10	10	12	
Total accredited programs	Number	-	2	2	3	
Nationally accredited programs	Number	-	2	2	3	
Regionally accredited programs	Number	-	2	2	0	
Internationally accredited programs	Number	-	2	2	0	
Total direct project beneficiaries	Number	-	278	278	567	
Female direct project beneficiaries (%)	%	-	25%	25%	24%	
Total faculty and PhD students participated on exchange programs	Number	-	-	-	90	
No. of Female faculty and PhD students participated on exchange programs	Number	-	-	-	9	
Amount of externally generated revenue by the ACEs	USD	-	3,050,000.00	3,050,000.00	3,991,091.63	
Total No. of internationally recognized publications		-	60	60	100	
No. of internationally recognized publications co-authored with regional collaborators	Number	-	-	-	30	
No. of institutions hosting ACEs participating in the PASET benchmarking exercise	Number	-	1	1	1	

## Annex – II

ACE Climate SABC -Haramaya University DLR Achievements by Nov, 2023				
DLIs and DLRs	Modified	Achieved by Nov. 2023	% achievement	Remark
<b>DLI# 1 Total Institutional readiness</b>	<b>1,100,000</b>	<b>1,100,000</b>	<b>100.00</b>	
DLR# 1.1 To meet conditions for effectiveness	600,000	600000	100.00	
DLR# 1.2 Development of detailed implementation plan	500,000	500000	100.00	
<b>DLI# 2 Total Education (Learning and research excellence/development impact)</b>	<b>4,300,000</b>	<b>3,735,800</b>	<b>86.88</b>	
DLR# 2.2 Newly enrolled Students	1,300,000	1,356,550	104.35	
DLR# 2.3 Accreditation of quality of education programs	600,000	300,000	50.00	
DLR# 2.4: Collaboration and partnership applied research and training	200,000	200,000	100.00	
DLR# 2.5: Peer-reviewed journal papers or peer-reviewed conference papers prepared collaboratively with regionally or international partners	500,000	500,000	100.00	
DLR# 2.6: Faculty and PhD student exchanges to promote regional research and teaching	700,000	379,250	54.18	
DLR# 2.7: External revenue generation	900,000	900,000	100.00	
DLR# 2.8: Institution participating in benchmarking exercise	100,000	100,000	100.00	
<b>DLI# 3: Timely transparent and institutional reviewed Financial Management Total</b>	<b>300,000</b>	<b>91,250</b>	<b>30.42</b>	
DLR# 3.1: Timely withdrawal application supported by financial reporting on the ACE account for the period	75,000	15,625	20.83	
DLR# 3.2: Functioning Audit Committee under the university council	75,000	0	0.00	
DLR# 3.3: Functioning internal audit unit for the university	75,000	60,000	80.00	
DLR# 3.4: Transparency of financial management (audit reports, interim financial reports, budgets and annual work plan are all web accessible)	75,000	15,625	20.83	
<b>DLI# 4: Timely and audited Procurement</b>	<b>300,000</b>	<b>240,000</b>	<b>80.00</b>	
DLR# 4.1: Timely Procurement Audit Report for each ACE	150,000	90,000	60.00	
DLR# 4.2: Timely and satisfactory procurement progress report for each ACE	150,000	150,000	100.00	
<b>Total</b>	<b>6,000,000</b>	<b>5,167,050</b>	<b>86.12</b>	
<b>Difference in USD</b>		<b>832,950</b>		
<b>% achievement</b>		<b>86.12</b>		

Annex – III

Grievance Redressed Mechanisms

Name of the ACE: ACE CLIMATE SABC – HARAMAYA UNIVERSITY					
Status of Grievances registered from Jan - May 2022					
No. of unresolved grievances from previous period (Old) (a)	Period (b)	No., of grievances recorded (New) (c)	No., of grievances resolved (New + Old) (d)	No., of grievances unresolved (New + Old) (e) = (a)+(c)-(d)	Remarks (Count of Grievances by Nature of Grievances)
0	July 2022	7	7	0	SIX RSIF (7) PhD students of power and water cut from their apartment. The Center assigned one technical to permanently check the availability of these utilities and report to the concerned office for immediate action in case of distribution to fix it immediately. The problems were not reported ever since.
	Aug. 2022	3	3	0	Three (3) RSIF students reported interruption of Internet connectivity from the apartment building for couple of days. We have given the contact number of the ICT expert to ask for restoration anytime the connection is down. The expert was also informed to entertain the requests of these students without delay.
	July - Oct, 2022	8	0	8	Six (6) MSc and Two (2) PhD regional students complained about the delay of transfer of stipends and research funds instalments due to limitation at the National Bank of Ethiopia (NBE). The case has been regularly taken to the bank officials and staff and little has been improved.
1.	Was there any gender-based violence related grievances? (Yes/No)				NO
2.	If yes, what was it? Also, what is the status of grievances?				N/A
3.	Do you maintain a grievance log? (Yes/No) If yes, is it updated? (Yes/No). i.e., with all records of grievances reported and actions taken!				YES

Updates on implementation of approved ESMP

Refer to your approved ESMP, follow below sample format

S/N	Activity	Parameter/ Monitoring	Indicators/Items	Rating	Status or Implementation Update	Corrective Action Required
1	Environmental Rehabilitation Activities	Notification and worker Safety	ACE Climate SABC staff members, students have planted thousands of seedlings in July 2022 at an enclosed areas on the University Compound and at the nearby rural village as part of the Green Legacy Initiative			
2	Environmental Safety and Awareness Creation Training	Report on the Training	Training on Environmental and Social Safeguard: Ecofriendly Landscaping and Waste Management was provided to 30 trainees			
3	Ethics on Environmental and Social Safeguard	Ethical standards	Students are encouraged to take up issues of environmental and social safeguard in their research			

**RATING/COMPLIANCE ASSESSMENT.**

Status	Color code	Interpretation
Conforming (C)	C	Compliance with requirements; no corrective action required.
Partially conforming (PC)	PC	Partial compliance with specific requirement; corrective action needed to ensure full compliance.
Non-conforming (NC)	NC	Non-compliance with specific requirement; corrective or remedial action is essential.
Not Applicable (NA)	NA	Not in the ESMP.
Observations	None	These are negative findings that do not represent any specific breach of legislation but have the potential to lead to adverse impacts in the absence of deliberate interventions/corrective actions.

**Annex - IV**

ACE Climate SABC – Haramaya University

Contract Register

No. of contracts	Contract Description	Contractor	Method of Proc.	Contract Sum	Vocher No	Contractual Start Date	Contractual Completion Date	REMARK
1	AIR TICKET	Ethiopian Airlines	Direct	279,999.00	96992	4/7/2017	18/08/17	
2	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	53,335.28	930068	19/08/2018	23/08/2018	
3	HOTEL SERVICE	TRIANGE HOTEL	Shopping	18,846.48	930071	10/8/2018	14/08/2018	
4	AIR TICKET	Ethiopian Airlines	Direct	3,873.00	930075	17/07/2018	21/07/2018	
5	AIR TICKET	Ethiopian Airlines	Direct	3,865.00	930079	11/4/2018	23/04/2018	
6	AIR TICKET	Ethiopian Airlines	Direct	42,412.00	101383	22/05/2018	30/06/2018	
7	AIR TICKET	Ethiopian Airlines	Direct			27/06/2018	28/06/2018	
8	AIR TICKET	Ethiopian Airlines	Direct			7/6/2018	28/06/2018	
9	AIR TICKET	Ethiopian Airlines	Direct			25/06/2018	8/7/2018	
10	AIR TICKET	Ethiopian Airlines	Direct			22/06/2018		
11	AIR TICKET	Ethiopian Airlines	Direct	51,565.00	930054	27/9/2018	15/10/2018	
12	AIR TICKET	Ethiopian Airlines	Direct			7/9/2018	17/09/2018	
13	AIR TICKET	Ethiopian Airlines	Direct			9/7/2018		
14	AIR TICKET	Ethiopian Airlines	Direct	69,210.00	97510	25/10/18	5/12/2018	
15	AIR TICKET	Ethiopian Airlines	Direct	286,269.00	930072	30/07/18	21/9/18	
16	OFFICE MACHINE	FOZI	Shopping	183,367.50	554666	6/2/2018		
17	HOTEL SERVICE	SAMRAT HOTEL	Shopping	18,974.62	554668	18/05/2018		
18	TITER	ADIS ALEMAYEW	Shopping	5,000.00	554722	2/4/2018		
19	CURTAIN	BERKHAL TRADING	Shopping	70,700.00	554730			
20	BOOKLET	TIMBER PRODUCTION	Shopping	87,400.00	554750	24/01/2018		
21	AIR TICKET	Ethiopian Airlines	Shopping	36,624.00	97531	21/11/18	1/1/2019	
22	AIR TICKET	Ethiopian Airlines	Direct	38,313.00	554737	19/02/2018	2/3/2018	
23	AIR TICKET	Ethiopian Airlines	Direct			20/02/2018	3/3/2018	
24	AIR TICKET	Ethiopian Airlines	Direct			27/02/2018	1/4/2018	
25	AIR TICKET	Ethiopian Airlines	Direct			3/2/2018	18/02/2018	
26	FURNITURE	DEJENE LEMA	Shopping	740,600.00	554705			
27	ROLL UP BANNER	PAPILOON	Shopping	7,100.00	554716	22/04/2018		



28	ELECTRONICS ITEM		Shopping	5,000.00	101361	29/05/2018		
29	MEGAZINE	TIMBER PRODUCTION	Shopping	103,500.00	101366	28/05/2018		
30	SPARPART	MOENCO	Shopping	4,025.00	930147	17/07/2018		
31	STATIONARY		Shopping	4,200.00	930146	27/03/2018		
32	SOFA TABELE		Shopping	4,800.00	930145	4/9/2018		
33	PILLO		Shopping	5,000.00	930163	10/12/2018		
34	STATIONARY		Shopping	2,000.00	930164	13/12/2018		
35	HOTEL SERVICE	TRIANGE HOTEL	Shopping	5,788.05	930167	1/6/2018	4/6/2018	
36	AIR TICKET	Ethiopian Airlines	Direct	7,488.00	97502	30/06/2018	4/7/2019	
37	AIR TICKET	Ethiopian Airlines	Direct	52,644.00	97501	26/04/2018	30/06/2018	
38	AIR TICKET	Ethiopian Airlines	Direct	3,875.00	930110	7/9/2018		
39	VEHICLES	LTA	Shopping	2,692,898.83	97483	30/01/18	7/7/2019	
40	BED	FINFINE FURNITURE FACT	Shopping	25,202.87	930114		26/10/18	
41	MATTERESS	RENBOW FACTORY	Shopping	93,150.00	930114		26//10/18	
42	AIR TICKET	Ethiopian Airlines	Direct	100,831.00	930184	25/12/18		
43	AIR TICKET	Ethiopian Airlines	Direct			10/12/2018		
44	AIR TICKET	Ethiopian Airlines	Direct			7/12/2018		
45	AIR TICKET	Ethiopian Airlines	Direct			20/12/18		
46	MOBILE CARD	HIDASE	Shopping	8,400.00	700163	5/12/2019		
47	HOTEL SERVICE	TRIANGE HOTEL	Shopping	21,569.15	707032	11/8/2019	16/08/2019	
48	AIR TICKET	Ethiopian Airlines	Direct	65,734.00	700156	16/10/2019		
49	AIR TICKET	Ethiopian Airlines	Direct			16/11/2019		
50	AIR TICKET	Ethiopian Airlines	Direct			16/11/2019		
51	AIR TICKET	Ethiopian Airlines	Direct	37,635.00	700213	5/12/2019		
52	AIR TICKET	Ethiopian Airlines	Direct			12/12/2019		
53	AIR TICKET	Ethiopian Airlines	Shopping			24/12/19		
54	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	6,633.99	707026	21/07/19	26/07/19	
55	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	5,955.65	707026	16/07/19	19/07/19	
56	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	11,089.00	707025	5/2/2019	2/8/2019	
57	HOTEL SERVICE	RAS HOTEL	Shopping	12,403.99	183258	12/4/2019	25/04/19	
58	AIR TICKET	Ethiopian Airlines	Direct	33,225.00	700182	15/11/19	25/12/19	
59	AIR TICKET	Ethiopian Airlines	Direct	37,635.00	700213	5/12/2019	7/2/2020	
60	HOTEL SERVICE	TRIANGE HOTEL	Shopping	20,901.37	866053	7/9/2019	22/10/19	

61	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	2,643.00	707025	8/5/2019	10/5/2019	
62	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	1,515.08	707025	2/5/2019	3/5/2019	
63	HOTEL SERVICE	WONDERLAND HOTEL	Shopping	6,931.00	707025	3/5/2019	11/5/2019	
64	HOTEL SERVICE	TRIANGE HOTEL	Shopping	891.09	183251	5/4/2019	6/4/2019	
65	HOTEL SERVICE	RAS HOTEL	Shopping	12,403.99	183258	14/04/2019	25/04/2019	
66	AIR TICKET	Ethiopian Airlines	Direct	24,098.00	931428	12/3/2019		
67	AIR TICKET	Ethiopian Airlines	Direct			5/3/2019		
68	AIR TICKET	Ethiopian Airlines	Direct			17/04/2019		
69	AIR TICKET	Ethiopian Airlines	Direct	29,614.00	183260	14/4/2019	26/4/2019	
70	AIR TICKET	Ethiopian Airlines	Direct			2/6/2019		
71	HOTEL SERVICE	RAS HOTEL	Shopping	4,140.98	866068	19/05/2019	22/05/19	
72	AIR TICKET	Ethiopian Airlines	Direct	9,600.00	866069	3/9/2019	8/9/2019	
73	AIR TICKET	Ethiopian Airlines	Direct			15/09/2019	21/09/2019	
74	TEA AND COFFEE ITEM		Shopping	5,000.00	930196	16/05/19		
75	FLOWER BATH		Shopping	5,000.00	930197	16/10/19		
76	AIR TICKET	Ethiopian Airlines	Direct	78,339.00	183283	14/06/19		
77	AIR TICKET	Ethiopian Airlines	Direct			21/05/19		
78	AIR TICKET	Ethiopian Airlines	Direct			2/5/2019		
79	AIR TICKET	Ethiopian Airlines	Direct			24/05/2019		
80	CARPENT	ROBA	Shopping	7,245.00	707033	20/08/2019	28/08/2019	
81	CURTAIN	ROBA	Shopping	23,000.00	707033	20/08/2019	28/08/2019	
82	MOBILE CARD	HIDASE	Shopping	8,400.00	707048	23/9/2019		
83	HOTEL SERVICE	TRIANGE HOTEL	Shopping	5,468.76	707050	19/08/2019		
84	AIR TICKET	Ethiopian Airlines	Direct	20,042.00	707034	16/07/2019	21/07/2020	
85	AIR TICKET	Ethiopian Airlines	Direct			21/07/2019	27/07/2019	
86	HOTEL SERVICE	TRIANGE HOTEL	Shopping	1,053.35	930180	4/1/2019	5/1/2019	
87	HOTEL SERVICE	TRIANGE HOTEL	Shopping	27,294.95	101395	27/07/2019	29/07/2019	
88	AIR TICKET	Ethiopian Airlines	Shopping	19,535.00	101396	7/9/2019	10/9/2019	
89	TITER	ADIS ALEMAYEW	Shopping	4,100.00	97518	13/07/2019		
90	TIRE	H.Z ROHOBOT PLC	Shopping	100,625.00	38263	20/05/2020	2/6/2020	
91	HOTEL SERVICE	RAS HOTEL	Shopping	45,228.92	364851	5/2/2020	8/2/2020	
92	laptop	online computer trading	Shopping	344,000.00	734303	2/7/2021	4/8/2021	
93	stationary	tigist zewede stationary	Shopping	58857	734301	7/7/2021	5/8/2021	

94	note book	central printing press	Shopping	86990	734320	27/7/2021	18/8/2021	
95	carpet	roba carpet and curtain shop	Shopping	169050	322238	1/11/2021	17/11/2021	
96	paint	sam mukutar ismael	Shopping	87565	322237	1/11/2021	17/11/2021	
97	mobile apparatus	girma wale electronics trading	shopping	218500	809274	1/6/2022	24/06/22	

## Annex – V

ACE Climate SABC

Matrix of Project Beneficiaries

Target beneficiaries	Benefits
1. Students	High quality of education and training, cultural exchange, confidence building, networking with fellow students, faculty/scholars, Center’s staff, industry employees during internship
2. Employer	High quality/skilled personnel, results of applied research, scientific knowledge for productivity improvement (better ways of doing things), knowledge partners
3. Communities	Best climate smart agriculture and biodiversity conservation practices, technologies and principles.
4. Faculty and staff	Improved teaching and research conditions and professional development opportunities through joint course delivery and students’ supervision, research, publication, exchange program, skill enhancer short courses, conference participation,
5. Faculty and students in STEM	Exchange visits, collaborative teaching and research, and other knowledge sharing activities.
6. Regional institutions (EAC & SADC)	Improved capacity through networking and experience sharing, staff/student exchange, joint events, focused research priority areas
7. Haramaya University (the host)	Increased visibility and internationalization of programs, benchmarked among African University, Africa Host University (AHU) for PASET- RSIF scholarship, attracted addition funding for complementary projects, capacity building, networking

## Annex V

### Summary of Innovations and Knowledge Transfers

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- ◇ In a study conducted in Uganda, CSA practices such as permanent planting basins, halfmoon, mulching increased maize grain yield and water use efficiency in sub humid regions of Uganda as compared to the conventional farming practices.
- ◇ A study in Tanzania reported that evaluation of water productivity and agronomic performance of paddy rice through water saving irrigation and nitrogen fertilization revealed that less water can be used to produce more crops under alternative rice growing practices. The results are important for water-scarce areas, providing useful information to policy makers, farmers, agricultural departments, and water management boards in devising future climate-smart adaptation and mitigation strategies
- ◇ A study conducted in Tanzania again revealed that sustainable Rice Intensification (SRI) with 90 kg N showed higher climate change mitigation potential (with lower GHG emissions) and reduced global warming potential (GWP) without compromising rice yield.
- ◇ Small-scale irrigation significantly improves farm households' livelihoods and mitigates the effects of climate change by enhancing their ability to respond to erratic weather events, which builds their resilience
- ◇ A study in Zimbabwe reported presence of a wider gap between the rich and the poor in adopting CSA technologies. Hence, decision makers need to consider implementing policies that focus on the poorer segments of the farming society to alleviate differences in the adoption of such agricultural technologies.
- ◇ Embracing Indigenous Knowledge (IK) and Local Institutions (LI) in climate change adaptation projects can enhance adoption and scaling success of climate-smart agriculture innovations in smallholder farming
- ◇ High temperature negatively affected performance of dual-purpose chickens and Sasso T44 performed better in terms of growth, meat quality and efficiency.
- ◇ Supplementation with coriander seed powder improved performance of dual-purpose chickens and has a positive effect on reducing the negative effects of high temperature.
- ◇ Many climate projections studies by our students revealed that there is a trend of increase in temperature and decrease in rainfall in many parts of Africa resulting in reduced productivity and affecting vulnerable organisms including humans, crops and livestock.
- ◇ Studies also indicated that changes in land use/cover are mostly from forest and grasslands to cultivated lands which results in lower soil organic carbon stock, lower carbon sequestration, reduced feed resources, and reduced ecosystem service values. Hence, there is a need to use climate smart agriculture practices that will reduce the vulnerability of smallholder farmers to climate change through enhancing the productivity of crops and livestock and reducing GHG emissions.
- ◇ Farmers' adoption of CSA practices is affected by several factors including access to CSA technologies, infrastructure, access to institutional services, level of education, land size, access to credit and extension

services. Hence, there is a need for prudent policy and institutional strategies in improving access to credit and extension services especially to youth and women, consider implementing policies that focus on the poorer segments of the farming society to alleviate differences in the adoption of such agricultural technologies and embracing Indigenous Knowledge (IK) and Local Institutions (LI) in climate change adaptation.

- ◇ It has been revealed that smallholder farmers use different techniques to adapt to climate change. For instance, a study in Eastern Hareghe zone of Ethiopia indicated that smallholder farmers in use practices like improved varieties of crops, crop diversification, adjusting planting dates, soil and water conservation practices, reducing livestock holdings, planting trees and small-scale irrigation adaptation strategies.
- ◇ A study also indicated that farmers' choice of adaptation strategies are significantly influenced by sex of the household head, landholding size, livestock ownership, access to extension, access to credit, social capital, market distance, access to climate change-related training, nonfarm income, agroecological setting and poverty status of the households.
- ◇ A study in Fogera plain of Ethiopia indicated that increase in weather variables such as Temperature Humidity Index (THI) decreased the growth parameters (birth weight and weaning weight) of Fogera cattle calves.
- ◇ A study on the effects of climate variability on livestock productivity in Southeastern Ethiopia indicated significantly higher ( $p < 0.01$ ) amounts of milk yield (3.32 litre/day) of dairying camel during dry periods than cattle and small ruminants. Camel and goats are perceived as drought-resistant livestock species and cattle keepers shifting to have more camel and goat in response to prevailing drought in the study area. Camel and Goats are more resilient to CC than Cattle. Hence, it is recommendable to choose camel and goat more likely than cattle and sheep raising with increasing temperature and decreasing pattern of rainfall that favour bush/shrub feed resources.
- ◇ A study on the effect of climate change on sweet potato virus disease in Kenya indicated that the geographical extent of areas at risk of sweet potato virus disease will increase for Kenya under future climate change scenarios from a current 36,736.09 km<sup>2</sup> to about 63,179.76 km<sup>2</sup> by 2085 under RCP 8.5. Increase in temperature and moisture variables will enhance niche suitability for sweet potato viruses and vectors. Therefore, the situation calls for climate smart practices such as better crop timing, better cultivar choice and management, integrated pest management and sustainable cropping systems to enhance sustainable production of sweet potato crop
- ◇ A study that evaluated the Regional Climate Models (RCMs) for simulating precipitation and temperature over the Guder subbasin of Upper Blue Nile Basin in Ethiopia, indicated that there is no best model for all conditions. The best model for rainfall simulation had a poor performance for temperature. Therefore, this justifies the need for evaluation RCMs model in order to choose the most realistic model for a localized climate impact study.
- ◇ According to a study conducted in the subhumid parts of Uganda, AquaCrop model is recommended as a reliable tool for assessing the effectiveness of the selected CSA practices for sustainable and improved maize production.

- ◇ Compared to the baseline (1988-2017), projected total rainfall, maximum and minimum temperatures would be higher in both climate periods (2040; 2060) and; emission scenarios (SSP245; SSP585) in the Great Rift Valley region of Ethiopia.
  - ◇ Age, sex, and education of the head; farmland size; livestock ownership; income; access to credit; climate information; training; and extension contact significantly influenced the selection of at least one CSA technology options in the GRV.
  - ◇ Conservation Agriculture (CA) (i.e., Crop rotation of cereals with legumes, minimum tillage, residue management) and optimum N fertilizer rate with supplemental irrigation is a promising CSA technology option to increase crop yield amp; reduce the trade-offs with N<sub>2</sub>O emission reduction in the future climate periods.
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