**Inputs provided by:** *International Center of Insect Physiology and Ecology (ICIPE), Nairobi, Kenya*

**1. General description of mandates and objective(s) of your organization / associated network with institutional structure**

*ICIPE is an international organization engaged in tropical insect science for development throughout Africa. The institutional objectives of ICIPE are based on 4-H (health) research approach focusing on areas of human, animal, plant and environmental health. ICIPE develops, introduces and adapts new tools and strategies for arthropod management that are environmentally safe, affordable, appropriate, socially acceptable and applicable by the target end-users, with full community participation.*

*ICIPE coordinates a four-year (2011-2015) research and development project on Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa- Increasing Knowledge, Building Capacity and Developing Adaptation Strategies (CHIESA). The project is funded by the Ministry for Foreign Affairs of Finland. The key objective is to fill critical gaps in knowledge related to climate and land use/ land cover change impacts on ecosystem services and food security by building the capacity of local research and administrative organizations through researcher training, enhancement of monitoring and prediction facilities and dissemination of data and information. Scientific outputs are shared with agricultural communities, extension agents and governmental institutions to support them to make decisions on available adaptation options and tools and to enhance their adaptation capacity.*

*The CHIESA Project has five lead partners who are responsible of the scientific and technical implementation of project activities in all three target areas. The lead partners are ICIPE, University of Dar es Salaam (TZ), Sokoine University of Agriculture (TZ), University of Helsinki (FI), and University of York (UK).These lead organizations supervise and mentor the research projects of selected (15) Ph.D. and (12) M.Sc. scholars from the staff of African stakeholder organizations, such as universities and research institutes. In total, there are 26 stakeholder organizations, including NGOs, participating in the project. The Ph.D. and M.Sc. scholars from different scientific backgrounds work together with local farmer communities and collect data (biophysical and socioeconomic) to address loss and damage associated with climate change impacts.*

*The roles of the stakeholder organizations in the project are divided into three categories: 1. Research and development activities, 2. Capacity building activities and 3. Dissemination and information sharing activities. Stakeholders in category 1 have nominated their staff member(s) to carry out academic degree training and scientific research under the project. These organizations are cooperating with the project in addressing loss and damage associated with climate change. Stakeholders in category 2 nominate their staff members to participate in training courses, workshops and seminars in order to build their capacity in climate change research, monitoring and development of adaptation strategies. In category 3, the stakeholders participate in the development and dissemination of project outputs, such as adaptation tools and strategies, for the end users.*

**2. Relevant operational framework(s)**

*ICIPE, the coordinating institution, has signed project agreements with the four lead partner organizations to allocate and use the resources received from the donor. These partner organizations will utilize the resources (financial and staff) according to the approved project work plan and time frame in order to reach the set objectives in research, capacity building, dissemination and development of adaptation strategies. The partner organizations further allocate resources to the stakeholder organizations which have bi-lateral project agreements with these lead partners. The utilization of resources is accounted and reported back to the coordinator and the donor twice a year with a technical report.*

*The lead partner organizations supervise the scientific work of their Ph.D. and M.Sc. scholars, who are staff*

*members of the stakeholder organizations. These scholars assess the loss and damage associated with climate change impacts as part of their research projects for their academic degrees. The lead partners allocate resources for the scholars' university studies, field research, data analysis, monitoring activities and travel and subsistence support for conferences and site visits. The scientific data and results are disseminated back to the target communities to inform them about the impacts of climate change in their area. This will further facilitate the collaboration between the project and the farmer communities to develop adaptation tools, options and strategies towards the detected changes at the local level. The project will provide resources for the mobilization of the farmers through training, exchange visits, demonstration sites and support for implementing the adaptation actions. Implementation is carried out in close cooperation with local stakeholder organizations involved in the project, such as NGOs, agricultural research institutions and extension agents.*

*The CHIESA project provides policy briefs and other materials for the government authorities and other decision-makers to inform them about the key findings and recommendations for adaptation actions. Materials are also produced and distributed to the public through different media, such as radio, TV and internet.*

### 3. Focus areas of risk management for loss and damage associated with climate change impacts

*The focus areas of the CHIESA Project (http://chiesa.icipe.org) research and monitoring activities mainly address slow onset impacts. Land cover and land use change detection using remote sensing and geospatial data provides baseline information for assessing the climate change impacts on habitats and biodiversity, as well as natural resources, in the target areas. Simultaneously, distributional information for flora and fauna are collected in the field sites, and a typology of how changes in vegetation and species may impact on ecosystem services will be established. Mountain forests are important habitats for pollinating insects as well as for the natural enemies (parasitoids) of the main insect pests for crops. Detected landscape level changes in the composition, quality and distribution of forest-agriculture mosaics are combined with the data on host and habitat utilization patterns of the insect species to analyze and model the impacts of climate change to pollination and pest control services provided by these ecosystems. The project collects and analyses data on current insect pest and parasitoid species composition, distribution, abundance, and quantifies the crop damage for maize, avocado, coffee and crucifers. In addition, to get a comprehensive view on the potential impacts, the eco-physiological and reproductive responses of the selected insect pests and their natural enemies are studied in simulated climate warming experiments and outdoor conditions. This will allow the development of predictive species distribution models and risk mapping of pest infestations/outbreaks related to different climate change scenarios.*

*According to Mugo and Gichuki (2009) insect pests, such as stem borers, can reduce maize yields by 13.5% per annum and negatively affect food availability in Kenya. In the highlands, the estimated maize crop loss from the maize stalk borer is about 15 million USD per year. The species distribution models and risk maps across the altitudinal gradients of the studied montane ecosystems can support the risk aversive strategies and management of crop pests there, contributing to improved yields and better food security. Our findings from the three study areas can be scaled up and replicated to other mountain regions in East Africa.*

*Another major component addressed in the CHIESA project is the impacts of climate change on water provision in the studied mountain areas. Predictive hydrological models are created using the available hydro-meteorological data and climate change scenarios. Also key areas for water provision, their management and uses are identified. The focus is on assessing the risk of loss of water resources and its impacts on livelihoods and food security.*

### 4. Geographic coverage

*Three target areas in the Eastern Afromontane Biodiversity Hotspot; Mt. Kilimanjaro in Tanzania, the Taita Hills in Kenya, and the Jimma Highlands in Ethiopia.*

**5. Key stakeholders**

ETHIOPIA: *Addis Ababa University; Climate Change Forum; Environment and Coffee Forest Forum; Environmental Protection Agency; Jimma University; National Meteorological Agency of Ethiopia.*

KENYA: *Department of Remote Sensing and Resource Survey; Jomo Kenyatta University of Agriculture and Technology; Kenya Agricultural Research Institute; Kenya Forest Service; Kenya Meteorological Department; Kenyatta University; National Museums of Kenya; University of Nairobi.*

TANZANIA: *Ministry of Water; Pangani Basin Water Office; Seliani Agricultural Research Institute; Tanzania Meteorological Agency; Tanzania Coffee Research Institute; Tengeru Horticultural Research and Training Institute; Tropical Pesticides Research Institute.*

REGIONAL: *Association for Strengthening Agricultural Research in East and Central Africa; Birdlife International (Africa); IUCN Eastern and Southern Africa; Regional Centre for Mapping of Resources for Development; University of Leeds, UK (Africa College); WWF US Ecosystem Services Group.*

**6. Implementation modality / delivery mechanisms**

*ICIPE coordinates the implementation of the project activities and carries out financial and substance management in close cooperation with a Steering Committee, which consists of the representatives of the lead partner organizations and two international experts. The Steering Committee is responsible of the coherent delivery of project outputs. A Supervisory Board, which consists of high level ministry representatives of the three target countries, ASARECA representative, and representative of the Ministry for Foreign Affairs of Finland (the donor), oversees project activities and outputs, approves the technical and financial reports, work plans and budgets, and disseminates and promotes the project outputs at the national level.*

*Lead partner organizations, including ICIPE, manage work packages under which scientific activities and development work is carried out, mainly by the Ph.D. and M.Sc. scholars in collaboration with their supervisors and home organizations (stakeholders). ICIPE facilitates community mobilization, networking with local stakeholders, farmers and relevant government departments in the target areas to implement these activities. The scholars will interact with the selected farmers in their farms while collecting data. Participatory research activities involve community members in data provision and sharing, as well as support local ownership of processes and outputs. The scholars will analyze the samples in their laboratories and offices, write scientific articles and provide a progress report for their supervisors. They also present their progress in annual project meetings and international conferences. ICIPE and the lead partner organizations prepare materials, organize training courses and workshops for the stakeholder organizations and target communities to share the scientific findings and get consultation, input and feedback from them before finalizing the outputs for dissemination. The scientific findings support the development of tools, mechanisms and options for climate change adaptation at the local level. The scholars and the project coordinator work with the farmers to develop community-based action plans and tools as well as local monitoring mechanisms to reduce risk and address loss and damage to selected crops and water resources.*

*ICIPE provides technical and financial reports to the donor bi-annually after these have been assesses and approved by the Steering Committee and the Supervisory Board. Policy briefs from different thematic areas studied under the project are published and delivered to relevant government departments, research institutes, NGOs, farmers' associations, ASARECA and different international organizations.*

**7. Key activities / outputs to date**

1. *Remote sensing and use of Geographic Information Systems in land cover and land use change monitoring and modeling. (Outputs to date: Available Remote Sensing (RS) and land cover data assessed, acquired and processed; high resolution and very high resolution satellite imagery available for various dates for the target areas. Geospatial datasets, land cover maps from different periods and land cover change results developed for the target areas.)*
2. *Economic valuation and modeling of the benefits of ecosystem services. (Outputs to date: Ecosystem services in target areas identified together with key stakeholders and gender-disaggregated stakeholder analysis for selected ecosystem services completed.)*
3. *Impacts of climate change on functional agro-biodiversity, food production and livelihoods. (Outputs to date: Data collection on species distribution and crop type, Regional level climate change projections generated, assessment report of the distributional changes for all target areas.)*
4. *Interaction between conservation, maintaining biodiversity and habitats of arthropods in agricultural landscapes under change assessed. (Outputs to date: Key data on insect pests and their natural*

*enemies and pollinators collected, available historical data compiled and digitized, hosts and habitat utilization patterns elucidated, sets of life-history traits data in simulated and natural warming conditions finalized.)*

5. *Assessment of climate change impacts on water resources for rain-fed and irrigated agriculture. (Outputs to date: Baseline hydro-meteorological information established and models developed, predictive hydrological models developed and key areas for water provision identified.)*
6. *Development of adaptation strategies for changes in pollination services and insect pest management in agricultural systems. (Outputs to date: Review of existing information on adaptation strategies, tools for climate change vulnerability assessed and creation of risk maps has started, socio-economic baseline data collected.)*

**8. Any additional information and contact details**

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