**What evidence is required for wildlife CORridor RESTORation interventions in human-inhabited landscapes, and how do we include these in the restoration management process?**

**CORRESTOR - Workshop 3 Outcomes**

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**Workshop synopsis:** This workshop was the third of four held as part of the CORRESTOR project. In this workshop we aimed to explore the restoration activities planned in the Northern Kilombero Valley, their alignment in space and time in relation to the ongoing restoration of a wildlife corridor, and the key stakeholders involved in the design and management of restoration projects. We wanted to explore the implications of restoration activities for biodiversity and wellbeing, including the positive and negative values of different plant species (including trees, bamboo, and other vegetation) and the navigation and mitigation of services and disservices, which may arise as a result of ecosystem restoration. We also used this opportunity to compile evidence to inform decision-making, and to draft preliminary policy recommendations for subsequent discussion with regional government stakeholders.

**Policy recommendations identified during the workshop**

1. Facilitate the establishment of a Kilombero Valley Restoration Platform to identify stakeholders and their connectedness, strengthen links and develop appropriate measures to maximise communication. This platform was repeatedly mentioned by Reforest Africa as being in the process of establishment and it builds on previous such platforms in the valley.

2. Close research and knowledge gaps in restoration actions to make them evidence-based. The research should focus on nine research challenges identified below.

***RC1****: extent and width of buffer areas* ***RC2****: choice of plant species for use in restoration planting* ***RC3****: governance and management constraints and opportunities relevant for the restoration process* ***RC4*** *species – site matching handbook* ***RC5*** *Identify species to plant along river ways.* ***RC6*** *Identify specify that should not be planted to avoid funneling elephants into specific* ***RC7*** *Monitor the effectiveness of planted species to funnel elephants along corridor routes.* ***RC8*** *effective and feasible options for mitigating impacts from human-wildlife conflict.* ***RC9*** *tree:crop interactions on farmed land*

3. Provide policy and financial support for development of measures to close the policy implementation gap. This requires clarity on potential of incentives (government buy in and long-term planning) and disincentives.

4. Develop technical capacity to increase stakeholder buy-in and restoration success rates. This includes calls for demonstration farms to maximise efficiency of crop yield production with and without trees. It also includes calls for access to information and training opportunities on site, possible with co-funding through the government.

Three agenda items were discussed during the workshop identifying specific research challenges outlined below:

1. How to restore and where to restore? Identifying opportunities and challenges including research challenges to fill knowledge gaps and management challenges.
2. Which plant species should be used in the restoration process? In which location?
3. How can we manage and mitigate negative impacts from restoration (sensu disservices) on people or biodiversity?

**1. How to restore and where?**

We identified key research *sensu* knowledge gaps that urgently need to be addressed to facilitate decision-making on restoration. We also identified key policy areas and governance challenges relevant for restoration on land. When discussing spatial prioritization needs, riverine areas were noted as systems which require urgent restoration prioritisation. When discussing issues around land tenure and tree ownership rights, we discussed the need to better understand, recognize and represent the socio-economic needs and socio-cultural perspectives of communities in restoration to ensure long-term success.

Research challenges (RC) that were identified:

**RC1**: What extent and width should buffer areas be? Should these be kept flexible depending on landscape context and economic needs?

**RC2**: What is the choice of plant species for use in restoration planting actions. Specifically, what are the ecological and socio-economic benefits and/or ecological drawbacks of species?

**RC3**: Can we identify governance and management constraints and opportunities relevant for the restoration process?

* Should communities have access to restored areas to harvest timber, firewood, food?
* Should livestock be permitted to graze in restored areas?
* Should restored areas be bordered by agricultural land?

**2. What plant species should be used and where in the restoration process?**

Positive and negative values relating to certain plant species and plant functional types were discussed in detail. It was highlighted that some knowledge exist that need to be compiled drawing on expertise from Reforest Africa, Agrisys Tanzania, TANAPA, Mwazingera Assocation, and STEP. Bamboo was highlighted as possessing high economic value for the community, more so than native tree species. However, the value of bamboo for biodiversity, prevention of riverside erosion and reduction of sediments is much lower compared to using tree species that are native and typically found in riverine areas. Native tree species have a greater potential for carbon stocks but may also have a root system more suitable to soil retention and water regulations along the riverine areas. Negatives include labour costs of tree nursery needs, the potential impacts of loss of water from rice fields, time it takes to grow and reap benefits, unknown response to unpredictable climate, and tree ownership uncertainties.

Research challenges (RC) that were identified:

**RC4** Develop a species – site matching handbook to outline what species to plant in which location and which species to avoid.

* Positive values: In addition to ecological and economic values, we need to account for climate smartness (species that can deal with climate change impacts) and biodiversity benefits (threatened species, rare species, habitat/resources for other species)
* Negative values: Species that we should avoid planting because of their invasiveness risk or negative impacts on ecological values or economic values (too water demanding). Avoid species with the potential for negative ecological or social impacts.

**RC5** Identify which species to plant along river ways

* Forest buffer zones: flexible widths? this needs to be handled flexibly depending on the spatial local context at farm scale
* Plant species at different locations along the buffer: might vary depending on priority of economic/cultural values over ecological values – context dependent at local scale.

**3. How can we manage and mitigate negative impacts from restoration?**

Disservices from restoration initiatives are of grave concern to some stakeholders and may outweigh any potential services anticipated from projects. Increased human-wildlife conflict will likely result because of wildlife corridor or riverine restoration. Certain tree species can attract animals such as elephants and therefore could increase elephant movement in restored areas if tree species favoured by elephants are used. Concern from stakeholders, including STEP, pointed to rising elephant numbers and elephant crop damage incidents in the Kilombero Valley. Tree presence reduces agricultural productivity (shade, water demands etc.) on adjacent farms and there is a loss of agricultural land to restoration corridors.

Research challenges (RC) that were identified:

**RC6** We need to identify specify which tree species should not be planted to avoid funneling elephants into areas used for high value crops or that harbour high population densities (e.g. villages).

**RC7** We need to monitor the effectiveness of tree species/other plant species used in the wildlife corridor restoration process to funnel elephants along corridor routes. Are these species attracting elephants away from farmed land? And how are they impacted themselves by elephant interaction?

**RC8** What are effective and feasible options for mitigating impacts from restoration in relation to human-wildlife conflict. A priority is to establish the effectiveness of tools over time through consistent monitoring and adaptation of measures in a strategic framework. These may include the use of different fencing types or innovative actions like channeling elephants through tree planting.

**RC9** What are the tree:crop interactions on farmed land? Which crop species can be planted with which trees and what are the yield outcomes of the planting mixes? Which species can be planted adjacent farmlands for maximum environmental and socio-economic benefits.