



ASSESSING COMMUNITY RESPONSES TO CLIMATE CHANGE AND POSSIBLE IMPACTS TO BIODIVERSITY



September 5, 2018

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CONSERVATION INTERNATIONAL



the Jane Goodall Institute

The Nature Conservancy



WORLD RESOURCES INSTITUTE



AFRICA BIODIVERSITY COLLABORATIVE GROUP

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*Report of the meeting held by the Global Change Impact Working
Group on August 14-16, 2018, Nairobi, Kenya*

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COVER PHOTO: Participants at the Assessing Community Responses to Climate Change and Possible Impacts to Biodiversity workshop held in Nairobi, Kenya on August 14-16, 2018.

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INTRODUCTION

ABOUT THE AFRICA BIODIVERSITY COLLABORATIVE GROUP

The Africa Biodiversity Collaborative Group (ABCG) is a consortium of seven U.S. based international conservation non-governmental organizations (NGOs): African Wildlife Foundation (AWF), Conservation International (CI), the Jane Goodall Institute (JGI), The Nature Conservancy (TNC), Wildlife Conservation Society (WCS), World Resources Institute (WRI) and World Wildlife Fund (WWF). ABCG is supported by USAID to advance understanding of critical conservation challenges and their solutions in sub-Saharan Africa.

ABCG's overarching goals of: a) mainstreaming biodiversity in human well-being and development agendas; b) promoting good conservation practices; and c) strengthening the role of social and development institutions in biodiversity conservation and human well-being, are currently being pursued within the context of five thematic foci:

1. Land and Resource Tenure Rights
2. Land Use Management
3. Managing Global Change Impacts
4. Global Health Linkages to Conservation
5. Emerging Issues

ABOUT MANAGING GLOBAL CHANGE IMPACTS

Climate change has direct impacts on ecosystems and biodiversity, but may also indirectly impact nature through human adaptation responses. For example, farmers in Madagascar are responding to perceived changes in rainfall by increasing hunting activity. In Namibia, farmers are expanding their cropland to cope with decreased production. Through its Managing Global Change Impacts (GCI) working group, ABCG has documented coping responses of human communities to climate change in 10 African countries: Cameroon, Gabon, DRC, Uganda, Kenya, Tanzania, Zambia, Namibia, Mozambique, and Madagascar, as well as the impacts of those responses on biodiversity, through surveys with key informants.

The aim of the GCI working group was to answer the following questions: a) what changes in weather and climate are communities facing in sub-Saharan Africa?; b) How are those communities responding to changes in weather and climate in this region?; c) How are those responses negatively impacting biodiversity?; d) What locations may experience such impacts in the future?; and e) What alternative responses should be promoted and implemented to benefit both people and biodiversity in this region?

The working group conducted 652 surveys, analysed the adaptation responses taken by communities, conducted analysis on observed trends in climate and modelled future crop suitability. Some of the main results of this work include:

- There are 46 types of adaptation responses representing what farming and fishing communities are doing in sub-Saharan Africa.
- Communities are mainly responding to declines in crop production, in livestock production and in water availability.
- Most responses identified through the surveys have a potential negative impact on biodiversity, most significantly in Madagascar, Gabon, Cameroon, Uganda, and Tanzania.
- Observed trends in climate data can provide insights on adaptation responses:
 - Increased trend in both the number of dry months and severity of drought conditions may lead to:
 - Declines in water, crop and livestock productivity
 - Responses with negative impacts on biodiversity
 - Increased temperature and rainfall conditions may lead to:
 - Logging, hunting and collection of forest products
 - Use of alternative fishing gear
 - Encroachment into marine protected areas
- By modelling future crop suitability, it is possible to predict how people may respond in the future:
 - In areas of decreasing agricultural suitability, people may likely:
 - Expand agricultural land, shift to different crop species, or diversify their livelihoods
 - In areas of increasing agricultural suitability, people may likely:
 - Expand farms into previously unsuitable areas, or intensify agriculture due to increased economic benefits

Understanding indirect impacts on biodiversity is extremely important for both adaptation and conservation planning. The results acquired through this study can inform governments, NGOs and the communities themselves on appropriate responses to not only assist local communities adapt to climate change, while also benefiting the biodiversity around them.

WORKSHOP SUMMARY

The GCI working group conducted a workshop from August 14-16, 2018 in Nairobi, Kenya to present the results of this thematic focus. This report provides a summary of the discussions and results of this three-day workshop.

Four participants of this project, representing CI, TNC, WWF and WCS, presented an overview of the observed trends in climate in Sub-Saharan Africa, how people respond to climate change in Sub-Saharan Africa and how those responses may impact biodiversity. Overall, about 35% of the adaptation responses identified through 652 surveys have potentially negative impacts on biodiversity, whereas only 12% have potential positive impacts. There is therefore a need to identify and implement alternative adaptation strategies that can benefit farmers and fishermen to adapt to climate change in the long-term, without negatively impacting biodiversity.

These presentations were followed by three break-out sessions where participants discussed alternative adaptation responses to help farmers and fishermen adapt to climate change in ways that do not negatively affect biodiversity. Building on this knowledge and their own experiences, participants developed 11 project ideas that could be implemented to help farmers and fisherman adapt to perceived climate threats that do not negatively impact biodiversity.

RESULTS OF BREAK OUT GROUPS

Break Out Group #1

Participants formed groups based on the regions where they work and discussed adaptation strategies that can be implemented to address the decline in livestock/crop/fish production that can also benefit both people and biodiversity, considering potential successes and barriers. Participants discussed the following questions:

- 1.1. Using the survey responses and climate analysis, and what you have learned in the presentations today, what are some adaptation responses/strategies that can be implemented to address the decline in livestock/crop/fish production/water in your region that can benefit both people and biodiversity?
- 1.2. Have you seen some of those adaptation response/strategies been implemented in the country where you work? If yes? What and where? If not, what are the barriers for the implementation of those strategies in the region where you work (e.g., lack of implementation capacity, lack of resources, lack of interest from farmers/fishermen, cultural barriers, etc.)

MADAGASCAR AND MOZAMBIQUE GROUP

The group came up with the following alternative adaptation responses/strategies to address:

<i>Impact</i>	<i>Adaptation Response</i>	<i>Where is it occurring?</i>	<i>Barriers</i>
Decline in crop production	<p>Conservation agriculture, including agroforestry systems and the use of cover crops</p> <p>Diversification from current livelihood, beekeeping and incorporation in addition to cash crops</p>	Eastern part and highland areas of Madagascar	<p>Lack of belief that the strategy will work</p> <p>There are other practices easier to be done (e.g., slash and burn agriculture)</p> <p>Slash and burn rice believed to taste better</p> <p>Difficult to do; farmers may not know how to implement it</p> <p>Overall political situation</p> <p>Beekeeping may not work during drought conditions</p> <p>Lack of access to market for cash and honey</p> <p>In Mozambique: Lack of financial resources to work with more farmers</p> <p>Lack of exchange among farmers</p>
Decline in fish production	<p>Establishment of temporary reserve</p> <p>Implementation of other sources of income for farmers (as they overfish due to the failure of crops)</p> <p>Improve fair trade-facilitating the link or access to market</p> <p>Mangrove restoration</p>	North and west part of Madagascar	<p>Lack of patrolling</p> <p>People often break the system</p>
Change in water	Collect water for irrigation	In Matuituine and	Only implemented in the pilot projects, and results and experiences not shared

		Inhambane in Mozambique	with other communities or outside the project area
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KENYA GROUP

<i>Impact</i>	<i>Adaptation Response</i>	<i>Where is it occurring?</i>	<i>Barriers</i>
Decline in crop production	Resistant crops (to drought, frost, disease) Diversifying crops Switching to other crops (i.e., sorghum, green grams, cassava, indigenous vegetables) Intercropping with plants which repel pests Greenhouses Minimal tillage Agroforestry		Resistance to GMO's, cultural barriers to alternate crops, cost of improved tech (e.g., greenhouse)
Decline in livestock production	Fattening program Planned grazing Ecotourism Improved breeds Switch to other livestock (i.e., goats, camels, sheep, chickens) Game farming Livestock insurance Conservancy approach		Cost of improved breeds Cultural barriers to alternative livestock Law and policy regarding game farming Lack of access to information
Change in water	Rainwater harvesting		Rainfall patterns

	Water pans Check dams Rock catchment Drip irrigation Watershed reforestation Policy (i.e., water use associations)		Expertise Policy Poor land use
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TANZANIA GROUP

<i>Impact</i>	<i>Adaptation Response</i>	<i>Where is it occurring?</i>	<i>Barriers</i>
Decline in livestock productivity	<p>Improved breeds – marketability, high quality, and resistant to drought</p> <p>Access to veterinary services</p> <p>Behaviour change</p> <p>Improved water infrastructure</p> <p>Land use planning</p> <p>Diversification of income – beekeeping, ecotourism, value addition, and Village Community Banks (VICOBA)</p>	<p>Monduli/Simanjoro</p> <p>Longido/Simanjoro</p> <p>Ngorongoro</p> <p>Kigoma/Mpanda</p>	<p>Cultural beliefs</p> <p>Investment costs</p> <p>Access to markets</p> <p>Conflicting policies</p> <p>Knowledge gaps – technical, education</p> <p>Local perceptions</p> <p>Population growth – immigration, number of family members</p>
Decline in crop production	<p>Climate smart agriculture</p> <p>Drought resistant crops</p> <p>Crop varieties</p> <p>Conservation agriculture – sustainable intensification, precision agriculture, terracing, mulching/composting, agroforestry</p> <p>Irrigation – drip irrigation</p> <p>Behaviour change</p> <p>Land use planning</p>	<p>Kigoma/Mpanda</p> <p>Iringa/ Morogoro/ Kiteto</p> <p>Singida, Monduli, Ngorongoro</p>	<p>Knowledge, learning, technical</p> <p>Investment costs</p> <p>Farmer groups not organized</p> <p>Conflicting policies</p> <p>Coordination between sectors</p>

Decline in water	<p>Water infrastructure constructed – boreholes, harvesting rainwater, and protection of water source</p> <p>Water conservation – watersheds, planting trees around water sources</p> <p>Mobilizing/Capacity building – water user associations and village level</p>		<p>Technology</p> <p>Absence of water user associations</p> <p>Investment costs</p> <p>Unsustainable agriculture practices</p> <p>Hillside/upstream siltation</p>
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CAMEROON + NAMIBIA GROUP

Cameroon

<i>Impact</i>	<i>Adaptation Response</i>	<i>Where is it occurring?</i>	<i>Barriers</i>
Decline in crop production	Agroforestry – planting trees with crops	Northern Cameroon	<p>Training – local people are unsure how to grow trees, which species to use, etc.</p> <p>Resources – Raising tree seedlings requires planting materials, water infrastructure</p>
Decline in livestock production	<p>Build Water Infrastructure</p> <p>THEN</p> <p>Produce and store forage</p>	<p>Northern Cameroon</p> <p>Mali & Senegal</p>	<p>Training – Local people need assistance in designing and building water infrastructure, and for techniques to dry and store forage.</p> <p>Resources – Water infrastructure (pumps, tanks, etc.) are expensive.</p> <p>Project Design – Needs to become a business where forage is produced and sold. This would ensure project longevity beyond any NGO involvement.</p>

Change in water	Build Water Infrastructure THEN Riverbank tree planting (to stop erosion)	Northern Cameroon – in private lands	Training – Local people need assistance for designing and building water infrastructure, and for raising tree seedlings Resources – Water infrastructure and seedlings require considerable initial investment, but should be self-sustaining after this.
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Namibia

<i>Impact</i>	<i>Adaptation Response</i>	<i>Where is it occurring?</i>	<i>Barriers</i>
Decline in livestock production	Apply sound rangeland management practices	Kunene Region	Labour Intensive – Requires actively leading cattle towards/away from certain areas
Decline in livestock production	Re-seeding of perennial grasses	Kunene Region	Rainfall – Climate change is reducing rainfall making it difficult to grow grasses.
Decline in water	Drill Boreholes	Kunene Region	Resources
Decline in water	Develop Water Management Plan	Kunene Region	Resources – To organize and facilitate discussions between stakeholders Knowledge – Experts on water management are needed to help develop plan and teach local people.
Decline in water	Harvest Rainwater	Dams – Kunene region Tanks – Masai Mara (Kenya)	Resources – To organize construction of tanks/dams Knowledge – Teaching on responsible use of harvested water required.

Break Out Group # 2

Each group reviewed the adaptation responses that they identified in Break-out Session 1 to:

- Make sure the response is climate adaptive
- Identify for whom resilience will be increased
- Identify to what climate threat (droughts, floods, changes in rainfall patterns, etc) the resilience will be increased
- Make sure that the response does not have bad outcomes for biodiversity

MADAGASCAR AND MOZAMBIQUE GROUP

Alternative adaptation responses to the decline in crop production:

- Building resilience to drier and warmer conditions with sporadic high rainfall events
- Building resilience for farmers
- Conservation agriculture that includes cover crops, diversification, and agroforestry
- Location: Ambositra-Vondrozo Forest Corridor (COVAF)
 - Cover crops:
 - Improve soil humidity
 - Protect soil against wind and rain erosion
 - Train farmers on the importance of cover crops- especially important in Mozambique
 - Diversify crops:
 - Diversify with drought-resistant seeds or seeds appropriate for the drier and warmer conditions
 - Important to teach farmers how to select drought resistant seeds or to have a system to provide seeds to farmers
 - Need strong collaboration with Ministry of Agriculture
 - Use of new agricultural calendar when planning or adjust it to make it appropriate to the local area
 - Agroforestry:
 - Provide shade and protection from heavy rains
 - Improve income and food for farmers
- Good for biodiversity as:
 - Reduces need for watering
 - Reduces farmland extension

Alternative adaptation responses to decline in water resources:

- Reforestation is very important and water decline is an issue, but restoration may be expensive
- One option is to start by implementing nurseries with fruiting trees
- And perhaps implement rainwater harvesting systems so water can be stored when it is abundant and be used during drought periods
 - May be possible in COFAV in Madagascar as they have heavy rainfall events during short periods of times
 - May be a short-term solution in Mozambique as GAZA is very dry and rains very little

Alternative adaptation responses to decline in fish production:

- Building resilience in response to: Increased winds, increased droughts, decreased rainfall
- Building resilience for: Fishermen
- Fisherman cannot go fish in open sea due to an increase in wind and, as a result, they end up overfishing in mangrove areas
- Another indirect impact of climate change on fishing production is that farmers that are experiencing a decline in crop production start to go to mangrove areas to fish.
- Establish temporary reserve
- Mangrove restoration
- Management plan for the areas to determine the temporary reserve and mangrove restoration

KENYA GROUP

Alternative adaptation responses to decline in water resources:

Rainwater harvesting:

- Building resilience to: Drought, decreased rainfall, changing seasonality of rains
- Building resilience for: People, livestock, wildlife, crops
- Impacts to biodiversity:
 - Water for wildlife (+)
 - Decreased natural habitat encroachment (+)
 - Increased vegetation cover (+)
 - Increased human-wildlife conflict because wildlife is attracted to water tanks (-)
 - Decreased water runoff (-)

Alternative adaptation responses to the decline in crop production:

Agroforestry:

- Building resilience to: Drought (less evapotranspiration), heat (provides shade), flooding
- Building resilience for: Farmers, livestock, wildlife, crops
- Impacts to biodiversity:
 - Increased plant diversity (+)
 - Increased animal diversity (+)

- Undergrowth suppression (-)

Alternative adaptation responses to decline in livestock production:

Planned grazing:

- Building resilience to: Drought, decreased rainfall, changing seasonality of rains, flooding
- Building resilience for: Pastoralists, livestock, wildlife, water table
- Impacts to biodiversity:
 - Increased animal diversity (+)
 - Increased plant diversity (+)
 - Food for wildlife (+)
 - Human competition for pasture and resources (-)
 - Bushmeat hunting (-)

TANZANIA GROUP

Alternative adaptation responses to decline in livestock production:

Improved livestock breeds

- Building resilience to: Loss of livestock productivity
- Building resilience for: Pastoralists
- Impacts to biodiversity: Reduce habitat loss/destruction (positive), reducing disease – cattle

Alternative adaptation responses to decline in crop production:

Increasing crop varieties – drought resistance

- Building resilience to: Crop loss
- Building resilience for: Small holder farms – subsistence, small scale sellers
- Impacts to biodiversity: Less susceptible to human wildlife conflicts, reducing destruction from slash and burn

Alternative adaptation responses to decline in water resources:

Improved water access

- Infrastructure – rainwater harvesting, protection of water source, and user committees.
- Building resilience to: Water scarcity, drought
- Building resilience for: Communities and water users – people, livestock, wildlife
- Impacts to biodiversity: Improving habitat, reducing human wildlife conflicts

CAMEROON + NAMIBIA GROUP

Cameroon

Alternative adaptation responses to decline in water resources:

Water Infrastructure

- Building resilience to: Increased rainfall seasonality

- Building resilience for: Farmers, pastoralists, village people
- Impacts to biodiversity: Neutral

Alternative adaptation responses to decline in crop production:

Agroforestry

- Building resilience to: Erosion, rainfall seasonality
- Building resilience for: Farmers, pastoralists
- Impacts to biodiversity:
 - Decreased erosion (+)
 - Food for animals (+)
 - Habitat for animals (+)
 - Carbon Storage (+)

Namibia

Alternative adaptation responses to decline in water resources:

Rainwater harvesting

- Building resilience to: Drought, change in rainfall
- Building resilience for: People (rainwater tanks), livestock (earth dams)
- Impacts to biodiversity:
 - Tanks – Neutral impacts
 - Earth Dams – Increased erosion, if not managed well

Alternative adaptation responses to livestock production:

Re-seeding of perennial grasses

- Building resilience to: Drought, erosion/runoff
- Building resilience for: Pastoralists, livestock
- Impacts to biodiversity:
 - Food for native species (+)
 - Reduced erosion (+)

Break Out Group # 3

Participants designed project ideas that describe an alternative adaptation option that can benefit both people and biodiversity and respond to the following:

- Where do you think would be the best place to implement the alternative adaptation responses identified in Break Out Group 2?
- What exactly will be implemented?
- Are there any barriers to overcome for a successful implementation?
- What the complete implementation will cost?
- When is the ideal timeframe for implementation?
- Is it sustainable in the long term?

MADAGASCAR AND MOZAMBIQUE GROUP

PROJECT IDEA 1. CONSERVATION AGRICULTURE AS A CLIMATE CHANGE ADAPTATION AND MITIGATION STRATEGIES WITHIN TOLONGOINA, COFAV – MADAGASCAR (Zo Rakotobe and Michel Randriambololona)

Geographical Location: Tolongoina Rural Municipality, a peripheral area of the COFAV protected area, is located in the eastern part of Madagascar. This humid forest is a watershed that provides electricity to Tolongoina village and provides drinking water and irrigation.

Beneficiaries: 25 smallholder farmer households as pilot farmers

What will be done: Crops diversification combined with agroforestry. This project will aim to reduce climate change impacts on local farming systems and improve crop production by practicing multicropping combined with agroforestry approaches. Crops include white beans, pinnate and ground pinnate that would grow in combination with cash crop trees (vanilla, coffee, cloves, litchi and banana). These agroforestry systems will improve farmers' incomes as well as store carbon, because farmers will only harvest fruits without cutting down trees.

Barriers: Some villagers hesitate to adopt these techniques.

How to overcome barriers: The project will provide more information, communication, and training about the advantages of practicing this type of conservation agriculture that will improve crop production and income. A strong collaboration with decentralized technical services from Ministry of Agriculture will be established to provide technical support for the community. The project will provide seedlings and small equipment for farmers to diversify crops.

Timeline: Two years

Activities	Year1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Developing the workplan and budget	X							
Information about the project start up (courtesy visits, build a collaboration with the Decentralized technical services)	X							
Identification and sensitization of the beneficiaries	X							
Communication and training of local technicians and communities	X	X						
Purchasing small equipment and seeds	X							
Preparation and implementation of the nursery		X	X					
implementing the project with Technical Services and local technician			X	X	X	X	X	X
Harvesting								
Implementing “Farmer to farmer” approach	-	-	-	X	X	X	X	X
Monitoring and evaluation	X	X	X	X	X	X	X	X
Project reporting		X		X		X		X

Long term sustainability: The project will train local technicians on conservation agriculture. In turn, they will train local communities and monitor these activities. The “farmer to farmer” approach will be adopted to mainstream these activities.

Budget: \$25,000 USD

Activities	Budget
Developing the workplan and budget	
Information about the project start up (courtesy visits, build a collaboration with the Decentralized technical services)	\$1,000
Identification and sensitization of the beneficiaries	\$500
Communication and training of local technicians and communities	\$2,000
Purchasing small equipment and seeds	\$1,000
Preparation and implementation of the nursery	\$1,500
implementing the project with Technical Services and local technicians	\$15,000
Harvesting	
Implementing “farmer to farmer” approach	\$1,500
Monitoring and evaluation	\$2,000
Project reporting	\$500
Total (USD)	\$25,000

PROJECT IDEA 2. BUILDING RESILIENT COMMUNITIES AND MANGROVE ECOSYSTEMS IN THE TSIRIBIHINA DELTA AND AROUND MORONDAVA DISTRICT, WESTERN MADAGASCAR (Judicael Rakotondrazafy)

Scope of the project: Tsiribihina Delta, Western Coast of Madagascar (Eight community based organizations in the mangrove area of Tsiribihina and Manambolo Delta and around Morondava District)

Context and objective: According to the survey conducted among communities in the Tsiribihina Delta on their perception of climate change impacts on their livelihoods and on nature, the decline of fish production is among the highly perceived impacts in this region. This is possible due to the increase in drought, the increase in temperature and in “hotter days” observed during the last five years. Those impacts are of concern, given that about 90 percent of the population in this area depend on fishing as a primary livelihood activity.

Drought and increasing temperature do not allow mangroves to regenerate naturally, which translates into reduced productivity of this ecosystem as a natural habitat for coastal products such as fish, crabs and shrimps. The frequency of strong winds does not allow fishermen to fish on the open sea and the increased frequency of droughts, which affect crop production, led farmers to become fishermen. Climate change therefore directly and indirectly contributes to the overexploitation of mangrove fish, crabs and shrimp.

This project aims to improve the productivity of mangrove ecosystems through the restoration of degraded area and the establishment of a fishing regulation system allowing the increase of fish stock through the establishment of a temporary fishing reserve.

Outputs and activities:

1- **Area covered by resilient mangroves increased (250 ha of mangroves restored)**

- Mangrove restoration using species tolerant to drought and variation of salinity
- Mangrove restoration by creating channels for seawater supply to dry areas

According to the priority in the Madagascar’s NDC’ → development of resilient community

2- **Livelihoods of communities improved (around 400 households)**

- Promote a temporary fishing reserve in the mangrove area

Barriers: The surrounding populations do not know the rules of management in the project area. Information and awareness raising is therefore a major action to be undertaken. This will strengthen actions on the implementation of the management plan in the project area. Additionally, illegal logging in the mangroves is still a challenge. So, the project will contribute to the strengthening of surveillance and monitoring activities in the mangrove areas.

Timeline: 2 years

Long term sustainability: In the long term, communities will have their capacity increased on how to establish fishing reserve and how to restore mangrove. So, it will not be difficult for them to continue to implement and monitor the activities.

Budget:

Output/ Activity	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 1: 250 ha of mangroves restored								
Information and awareness raising for surrounding population								
Implementation mangrove restoration								
Monitoring and surveillance/patrolling in the mangrove area								
Output 2: Fish production increased in eight LMMAs supported by the project								
Information and awareness raising of surrounding population								
Capacity building on temporary fishing reserve in mangrove area								
Implementation of temporary fishing reserve (closing and opening								
Evaluation, capitalization for the exit (sharing good practices)								

Output/ Activity	Cost (USD)
Output 1: 160 ha of mangroves restored	
Information and awareness raising for surrounding population	\$1,600
Implementation mangrove restoration	\$14,400
Monitoring and surveillance/patrolling in the mangrove area	\$900
Output 2: Fish production increased in eight LMMAs supported by the project	
Information and awareness raising of surrounding population	\$1,600
Capacity building on temporary fishing reserve in mangrove area	\$2,400
Implementation of temporary fishing reserve (closing and opening	\$7,200
Evaluation, capitalization for the exit (sharing good practices)	\$800
Other costs	\$900
TOTAL	\$29,800

KENYA GROUP

PROJECT IDEA 3. PLANNED GRAZING IN THE TAITA RANCHES, KENYA (prepared by the whole Kenya group)

KWCA & AWF. WORK IN 18 TAITA RANCHES (TSAVO). SYNERGIES IN RANCH MANAGEMENT, JOINT PLANNED GRAZING AND WATER RESOURCE MANAGEMENT.

Immediately start working on planned grazing.

*Begin with governance issues and come up with a plan on how to manage the ranches.

Barriers:

- Governance structures
- Vulnerability assessment report in some areas
- Collaboration between ranches, individuals and county governments. Institutionalized management.
- External encroachment from Somali Herders.
- Political influence to facilitate enforcement.

Timeline: Eighteen months: six months for planning, twelve months for implementation. Monitoring the success of the project will take longer than eighteen months, and will continue after project completion.

Sustainability: Employment opportunities, sale of the livestock generates money to continue planned grazing activities after one to two years of initial funding. Then the money is invested back to the business. At two years, we would then hand over the project to the community.

Cost: \$40,000-\$60,000 for: training, planning/zoning, livestock movement, mobile bomas, water provision, herders, planning and implementation, and veterinary services.

PROJECT IDEA 4. RAINWATER HARVESTING IN THE MARA CONSERVANCIES, KENYA (Prepared by the whole Kenya group)

WATER MANAGEMENT IN THE MARA CONSERVANCIES - RAINWATER HARVESTING AND STORAGE FOR LIVESTOCK, PEOPLE AND WILDLIFE. PURIFYING WATER FOR HUMAN USE. PILOTING IN A SINGLE MANYATTA.

Barriers:

- Cultural inhibitors to water harvesting
- Infrastructure barriers especially with the roofing of manyattas which cannot harvest water.
- Access to information
- High cost of the equipment

- Size of the houses for domestic use
- Maasai could pack up and leave the area.
- Are there enough houses with roofs?
- Can we regulate water usage?

Timeline: 18 months: three months planning, three to six months construction, nine to twelve months of monitoring and evaluation.

Cost: \$10,000 for a manyatta with 20 houses: mabati, timber, gutters, etc. would cost \$150 per house for the roof. 24,000 litre tank is \$3,000. Try to get a community contribution of \$2,000.

PROJECT IDEA 5. DAM FOR SURFACE WATER RUN OFF COLLECTION (prepared by the whole Kenya group)

Barriers:

- Land ownership
- Environmental Impact Assessment
- Topography
- Livestock vs. wildlife

Timeline: 18 to 21 months: six months planning, three months for construction, nine to twelve months for M&E

Cost: Excavation and construction is \$5-10K per dam.

TANZANIA GROUP

PROJECT IDEA 6. DRILLING BOREHOLES IN MONDULI DISTRICT – NORTHERN TANZANIA (Mziray S.B (District Administrative Officer - Monduli)

Tasks (What should be done)

- Assessing the need
- Identifying potential areas by collaborating with the Government experts (identifying accessibility of water - water table) and identifying the suitability of water for domestic use and wild animals which in turn reduces human wildlife conflicts.
- Analyzing the cost of two boreholes and cost of conducting training to the community towards climate change adoptability strategies.
- Identifying the cost of power installation preferably; solar, wind power, and electricity.

Barriers and strategies to overcome

- Water suitability for domestic use. Lab testing for water quality is an alternative to deal with this barrier.
- Community ownership of the project and sustainability. Doing some training and workshops to the community and strengthening governance of the project is the best option to deal with mentioned barrier.

Timeline: Expected time for this project is 12 months.

Long term sustainability

- Strengthening governance especially water users committee, educating the community by giving them training and workshops to leaders on the importance of water to their lives, protecting water sources, etc., empowering the community and analyzing the importance of the project and create awareness within the community.

Costs: This project will cost \$30,000 USD

- Assessments of water, governance (including seminars, workshops etc), lab testing of water, Research by drilling company = \$10,000 USD.
- Drilling two bore holes and installation of power and equipment = \$20,000 USD.

Environmental Benefits

- This project will reduce human wildlife conflicts since it includes construction of water points for domestic and wild animals.
- Tree plantation and horticulture activities will be supported by availability of water, which in turns supports the environment and health.
- Decrease of diseases which are transmitted by drinking unsafe water example; cholera, typhoid, etc.

Why needed?

- This project is highly needed in dry land landscapes, especially for pastoral societies to maintain their livestock. Also, most of the pastoral societies live in areas where wild animals are many so by implementing this project it reduces human and wildlife conflicts and hence biodiversity is maintained.
- This project supports tree plantations.
- This project helps to decrease transmitted diseases like Cholera and typhoid.

PROJECT IDEA 7. HONEY FOR ALTERNATIVE LIVELIHOODS FOR LIVESTOCK KEEPERS (Meshurie Melembuki/ Randilen Community Wildlife Management Area, Monduli District, Samantha Button/ Oikos East Africa)

Climate change has negatively impacted the livelihood of agro-pastoralists because increased drought leads to livestock loss. This project builds resilience for pastoralists by providing an alternative source of income. The impact on biodiversity is positive because at present with loss of livestock people are

shifting to eating bush meat and charcoal burning – with another source of income these negative practices for biodiversity will be reduced.

Where: Randilen WMA – this is a conserved area with many species of bees – research has shown that the quality of honey in conserved areas is higher as there is no pollution from farm pesticides or industrial pollution. In addition, Randilen WMA has a strong management and governance structure, so projects implemented in this area will be easier to implement, follow up and manage due to the required structures being in place.

What are you going to do: For this project, we propose the following activities:

Phase 1 – Planning and Preparation

1. Create awareness among AA and Board members about the concept and benefits of the project
2. Formulate small Honey committee of eight people (one from WMA management, three from the Authorised Association governing body and four from the community) to supervise and support the pilot project.
3. Honey Committee Capacity Building regarding how to manage the beehives, how to harvest, process and package honey etc (hire expert to carry out ‘train the trainer’).
4. Identify and prepare site for honey project including construction of beehive bandas
5. Honey Committee to purchase beehives and equipment and tools for processing, harvesting and packaging.

Phase 2 – Production and Sales

6. Honey Committee to carry out harvesting, processing and packaging of honey.
7. Honey Committee to identify potential markets, focused particularly on working with communications expert to develop marketing strategy including branding of ‘honey for conservation’.
8. Sell honey and distribute revenue

Phase 3 – Lessons Learnt and Project Replication

9. Carry out thorough exercise to review lessons learnt and develop new project proposals focused on empowering women’s groups in the community.

Barriers to overcome & ways to overcome them:

- Funding for investment in project especially initial investment in hives, equipment, capacity building, etc – Write funding proposals and loans from WMA or banks
- Access to a reliable source of water - borehole to be constructed close to honey project site. *(Although bees do require some water for breeding and production of honey, this is significantly less than the water required by livestock).*
- Committee accountability and commitment to delivering on intentions of the project, which has a long term aim of creating additional revenue for the WMA and women’s groups in the community – system of weekly reporting to the WMA manager and close monitoring or project will be introduced.

- Accessing reliable market for honey products – work with communications expert to develop marketing strategy for ‘honey for conservation’ (focusing on what differentiates this Randilen honey from other brands and options available on the market)

When: Starting October 2018 (project will run for two years)

Measures to be taken to ensure sustainability:

- The objective is for this project to be run as a pilot. The project will be managed by WMA management and board, and any revenue earned will go to the WMA, and will then be distributed (50% remains with WMA and 50% is distributed among eight member villages). In future, the project will be replicated among women groups throughout the WMA, and the Honey Committee will act as trainers for these women.
- Some of income from project will be used to fund future projects (income from 4,000 litres of honey will be 15,000 Tsh per litre = 60 million TSH). Total project cost for first year = 59 million, which can cover project costs and from second year project will earn profit for women groups and WMA (30 million each)

Price: Total approximately: \$26,320 (59,220,000 TZS)

No	Item	Unit	Quantity	No. Days	Cost per item	Total Cost TZS	USD	Note
1	Board meeting to introduce project and formulate committee	People	50	1	100,000	5,000,000	\$2,222	1 day meeting for 50 member board - 4 people from AA&WMA and 4 from community to be identified at this meeting for Honey Committee
2	Capacity building meeting	People	8	10	40,000	3,200,000	\$1,422	
3	Honey expert trainer fee	Days	1	15	150,000	2,250,000	\$1,000	10 days of training plus 5 days prep and reporting

4	Beehives	Units	100	1	250,000	25,000,000	\$11,111	
5	Bandas	Units	4	1	150,000	600,000	\$267	
6	Harvesting tools	Units	4	1	350,000	1,400,000	\$622	
7	Processing machine	Units	1	1	400,000	400,000	\$178	
8	Packaging bottles	Units	1000	1	5,000	5,000,000	\$2,222	1 litre bottles
9	Communications Expert fee	Days	1	10	150,000	1,500,000	\$667	Marketing Strategy to be produced
10	Review pilot to identify lessons learnt and develop new proposals	People	50	1	100,000	5,000,000	\$2,222	
Sub-total						49,350,000		
11	Ongoing management and follow up costs + contingency		20%			9,870,000		
TOTAL COST						59,220,000	\$26,320	

PROJECT IDEA 8. PROMOTION OF DROUGHT RESISTANT CROP VARIETIES IN THE WESTERN TANZANIA-KIGOMA & KATAVI REGIONS

Behavior Change - sensitization, outreach and education
\$1,000/village - \$2,000

Training for village leaders/councils
\$400/village - \$800

Selection /Identification of Community Agriculture Workers (champions/ambassadors) (Establish and/or Strengthen Farmer Groups). Special focus - Women and youth groups
\$400/village - \$800

Preparation of training materials – facilitators, curriculum.

\$400/village - \$800

On-site training provided on climate smart agriculture - drought resistant varieties + high yield potential —- maize, sunflower, rice (low water consumption) + drip irrigation.

\$2,400/village - \$4,800

Provision of inputs and supplies— seeds, fertilizer (including organic), drip irrigation materials

\$6,000/village - \$12,000

Establishing of demonstration plots/farmer field schools by the community agriculture workers.

\$1,000/village - \$2,000 – for instructors and supervisors

Ongoing extension services by district/ward agricultural officers in collaboration with community agriculture workers.

\$500/village - \$1,000

Visits by other farmers to demonstration plots for learning purposes.

\$200/village - \$400

Linking farmers to the suppliers directly (inputs)

\$400/village - \$800

Post-harvest training – training on value addition, manage the sacks of maize.

\$400/village - \$800

Barriers

- Cultural -
- Misinformation – on seed varieties
- Inadequate government extension workers
- Availability of funding

Impact to Biodiversity

Positive: Provided with address to the knowledge gap properly and adoption is done.

Negative: Pesticides without proper management.

Timeline: 12 months: July 2019 – June 2020

Long-term sustainability:

- Government ownership and directive for communities to adopt (government is pushing for food security – not providing alternative food/maize).
- Partnering – linking farmers directly with private input suppliers (district agricultural officer and district business offer are part of this)
- Linking farmers with crop insurance providers

Cost:

Total: \$24,600 + \$5,400 (staff time) = \$30,000/annum

Example of an activity (Forum CC): Toto shamba – climate smart agriculture practices – one acre. Each village announces the type of seeds to be planted – agro-ecological zoning. All members in the household have to participate in it (Singida). Eight bags of maize to 35 bags of maize.

PROJECT IDEA 9. LIVESTOCK QUALITY IMPROVEMENT PROPOSED PROJECT in SIMANJIRO, KITETO AND LONGIDO DISTRICTS OF NORTHERN TANZANIA (Jamboi Baramayegu – Ujamaa Community Resource Team (UCRT), Zabron Lulandala- Kiteto District Council; Samwel K. Olekao – Makame WMA)

Goal: Improvement of livestock breeds to respond to increasing drought.

Barriers:

- Cultural values and taboos
- Invasive species
- Access to veterinary services
- Access to water

How to overcome these barriers:**(a) Cultural Values and Taboos**

- Awareness raising and capacity building on the importance of improving breeds
- Conduct exchange visits for the communities and District Officials to learn from those with best practices in improving breeds

(b) Invasive Species

- To collaborate with other like-minded organizations to control invasive species

(c) Access to Veterinary Services

- To provide training to Community Animal Health Workers (CAHWs)
- To advocate for the government and other stakeholders to provide for the services and subsidize for inputs
- Provide seed capital for vaccination tools and drugs
- Provide motorbikes for CAHWS

(d) Access to Water

- Rehabilitation of water infrastructures (Cattle Trough, Earth dams, intake water pipes and distribution points).
- Construction of rain water harvesting tanks
- Formation and training of water user committees

4. TIME LINE:

No.	Activities	Time	Budget (USD)
1.	Awareness raising and capacity building on the importance of improving breeds	January, 2019	\$6,000
2.	Conduct exchange visits for the communities and District Officials to learn from those with best practices in improving breeds.	March, 2019	\$15,000
3.	Rangelands stakeholders' meetings to discuss how to eradicate invasive species	August, 2019	\$15,000
4.	To provide training to 15 Community Animal Health Workers (CAHWs)	February, 2019	\$6,000
5.	Provide seed capital for vaccination tools and drugs	April, 2019	\$9,000
6.	Provide 15 motorbikes for CAHWS	June, 2019	\$15,000
7.	Rehabilitation of water infrastructures (Cattle Trough, Earth dams, intake, Water pipes and distribution points).	June, 2020	\$30,000
8.	Construction of rain water harvesting tanks	October, 2020	\$15,000
9.	Formation and training of water user committees	June, 2020	\$5,000
10.	Purchase of 30 improved breeds	June, 2019	\$30,000
		TOTAL	\$146,000

Long term-sustainability: For sustainability, the community will be requested to contribute 10 percent of the total amount proposed and linked with district councils for technical support where needed.

CAMEROON AND NAMIBIA GROUP

PROJECT IDEA 10. WATER INFRASTRUCTURE AND AGROFORESTRY IN THE PERIPHERY OF THE FARO NATIONAL PARK, NORTHERN CAMEROON

What are we going to do?

- 1) Setup water infrastructure. Drill bore, setup solar pump, setup tank for storage.
- 2) Setup nursery. Fence nursery area, buying seeds, buying polyethylene bags for planting, fill sachet with soil and seeds, buy and apply fertilizer, raise seedlings, planting trees, put wire protection.

What are the barriers?

- 1) Money – resources for water infrastructure and trees etc.

- 2) Capacity
 - a. Mobilization of local stakeholders – make sure everyone is involved.
 - b. Training for how to prepare trees, fertilizer application, fencing techniques etc.
- 3) Ensuring that the program continues into the future, and doesn't die out after the first rounds of seeds are grown.

How will they be overcome?

- 1) Money to buy water infrastructure – requires NGO, aid support.
- 2) Gather local authorities and traditional leaders – to ensure buy in.
- 3) Hire consultant (local experts) to run Agroforestry training, so that afterwards the local community can continue the agroforestry practices.
- 4) Source continuing funds from nearby park – hunting concession which pays \$5,000-6,000 every year to the community.

Timeline

November 2018 – Building water infrastructure (dry season so building is possible)

November 2018 – Gathering local authorities and traditional leaders (mobilization of local stakeholders)

December/Jan 2018/19 – Consultant runs training sessions

Jan/Feb 2019 – Setting up nursery, raising seedlings

July/August 2019 – Planting trees

How will you ensure long-term sustainability?

- Through capacity building with local NGOs and villagers
- Consultant will return regularly to assess progress.
- Trees need 5-6 yrs. to start producing fruit/seeds which can be replanted. So, NGOs need to be involved for that time to supply resources to buy seeds.

Cost

Water infrastructure and nursery - \$15,000

Consultant/expert hire - \$3,000

Seed purchase, planting bags, fertilizer, wire protection - \$5,000

General coordination funds - \$7000

Total = \$30,000

PROJECT IDEA 11. RAINWATER HARVESTING INSIDE THE EPUPA CONSERVANCY IN THE KUNENE REGION, NAMIBIA

What are we going to do?

- 1) Identify potential villages.
 - Meeting with conservancy management committee
 - Consultations with selected villages

- 2) Identify expert/company to assist with construction
 - Talk to colleagues from NGO's
 - Put out tender for companies
- 3) Construction
 - Purchasing materials
 - Paying for labour
- 4) Ongoing management by conservancy committee
 - Assessing condition of tanks
 - Are they being used at all, and if so, used appropriately?

What are the barriers?

- 1) Money – resources to build infrastructure.
- 2) Education – educate communities on sustainable use of water harvested to ensure that it is not wasted and they don't go back to digging in rivers.

How will they be overcome?

- 1) Obtain funding from grant, NGO, etc.
- 2) Involvement from the conservancy management committee to educate villagers, follow up after construction. To ensure this water is strictly for human consumption not for livestock.

Timeline

Depends when funds are sourced, but tank must be built during dry season (March-October).

September 2018 – Meet with conservancy management committee to identify villages. Meet with villages also.

September 2018 – Get quotations from companies/experts for materials & construction

October 2018 – Purchasing & construction

November-Jan 2019 – Follow up to see if tanks are working well.

June 2019 – Follow up to see if tanks are helping with water availability, and are being used appropriately.

How will you ensure long-term sustainability?

Assign a manager to each water tank – responsible for maintenance, ensuring responsible use of water. This will be a local person and will not need payment.

Cost

Meetings/logistics - \$2,000; Construction company hire/materials - \$20,000; **Total = \$22,000**

KEY TAKE HOME MESSAGES FROM THE WORKSHOP

In addition to the list of project ideas developed during the workshop (presented in the previous section), those are the key take home messages from the workshop based on the discussions conducted and the feedback received from the participants:

- There are options to the adaptation responses that were identified during the surveys with the key informants, options that can help farmers and fisherman adapt to climate change while providing positive benefits to biodiversity.
- There are however barriers for the implementation of those alternative adaptation options, such as:
 - Lack of resources (including access to markets) to implement those alternative responses and to increase the capacity of the communities to implement them;
 - Lack of continuity when initial resources end;
 - Cultural values and taboos that can prevent the implementation of those alternative adaptation strategies;
 - Lack of information sharing regarding results achieved as strategies are often implemented as short-term, pilot projects; and
 - Lack of farmers and fishermen organization groups, which prevents farmers and fisherman to receive information about successful practices and financial resources, as well as to have access to market.
- Alternative adaptation strategies to the responses that farmers and fishermen are having should be sustainable in the long-term.
- Additional funding is needed for the implementation of those alternative adaptation strategies. However, long-term investments should allow communities to understand the importance of those strategies and give them the opportunity to sustain those strategies in the long-term
- Very positive feedback and insights from the participants about the workshop were received:
 - Activities conducted, and materials presented helped participants to understand more about climate change, and how to identify a climate adaptation strategy;
 - Participants were eager to share the results of the workshop with other colleagues;
 - Many of the participants did not have much experience on climate change, so the information presented and discussed in the workshop will help them to deal with climate change in their projects;
 - Participants expressed the importance of identifying long-time solutions to some of the problems identified through the surveys;
 - It was suggested to use the survey as a baseline and re-implement it in a few years; and
 - Participants acknowledged the donor for providing support for the project and for their interest in funding adaptation strategies that are good for people and biodiversity in the new phase.

NEXT STEPS

The report with the results of the three-year study is under development and will be shared with all workshop participants and widely once completed. It is anticipated that the project ideas developed and discussed in the workshop can be implemented by the workshop participants, as well as by the leads of this task when funding opportunities arise, including additional funds from USAID.

APPENDIX I: AGENDA

Time	Activity
Tuesday 14, 2018	
8:30 – 9:00 am	Arrival and Registration
9:00 – 9:15 am	Introductions and overview of ABCG <i>Evelyn Namvua - ABCG</i>
9:15 – 9:30 am	Overview of the Managing Global Change Impact thematic area and the agenda <i>Chris Zganjar - TNC</i>
9:30 – 10:00 am	Human response survey overview <i>Nikhil Advani – WWF</i>
10:00 – 10:45 am	Insights from field surveys <i>Field staff</i>
10:45 – 11:00 am	Tea Break / Photo session
11:00 – 11:30 am	Typology of adaptation responses to climate change impacts <i>Camila Donatti - CI</i>
11:30 – 12:00 am	Climate analysis and human responses in the survey sites <i>Chris Zganjar - TNC</i>
12:00 – 12:30 am	Future impacts of climate change on crop suitability and water provision <i>Kendall Jones - WCS</i>
12:30 – 12:45 am	Take home messages of presentations. Presentation on alternative responses (those that can be good for both people and nature) (Q&A) <i>Camila Donatti - CI</i>
12:45 – 14:00 pm	Lunch
14:00 – 15:30 pm	Break out groups #1 to discuss climate impacts and adaptation responses <i>Camila Donatti - CI</i>
15:30 – 15:45 pm	Tea Break
15:45 – 16:15 pm	Group report back and closing <i>Nikhil Advani – WWF</i>
18:30 – 20:00 pm	Group Dinner
Wednesday 15, 2018	
9:00 – 9: 15 am	Overview of agenda for Day 2 <i>Chris Zganjar - TNC</i>
9:15 – 10:15 am	Summary of working group discussion and identification of project ideas for implementation of adaptation <i>Chris Zganjar - TNC</i>
10:15 – 10:45 am	Tea Break
10:45 – 12:30 pm	Break Out Group #2 to develop ideas to overcome barriers in the implementation of responses that are good for both people and nature

	<i>Nikhil Advani – WWF</i>
12:30 – 13:30 pm	Lunch
13:30 – 14:30 pm	Group report back <i>Nikhil Advani – WWF</i>
14:30 – 15:45 pm	Break Out Group #3 to develop adaptation project proposals (optional) <i>Nikhil Advani – WWF</i>
15:45 – 16:00 pm	Tea Break
16:00 – 16:15 pm	Closing remarks <i>Chris Zganjar - TNC</i>
Thursday 16, 2018	
8:00 am – 14:00 pm	Field Trip: Safi Organics Limited, Mwea Ngurubani County

APPENDIX II: LIST OF PARTICIPANTS

	Name	Organization/Affiliation	Email	Location
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36	Mercy Mumo	Kenya Climate Innovation Center	mercy.mumo@kenyacic.org	Nairobi

APPENDIX III

[Workshop photos](#)

APPENDIX IV

[Workshop presentations](#)

APPENDIX V

[ABCG Global Change Impact Working Group video](#)

APPENDIX VI

[Tables and graphs on temperature, precipitation and Palmer Drought Severity Index for each site](#)