

# Ecosystem-Based Adaptation Through the Lens of Community Preferences



Photo 1: Community member attending to a tree nursery (Photo credit: EbA Project)

## Summary

Ecosystem-based Adaptation (EbA) practices are peoplecentered, nature-based solutions which aim to ensure that communities can cope with the adverse effects of climate change. These practices utilize biodiversity and ecosystem services as part of the wider adaptation strategies. In recent years, communities across the globe have embraced different EbA pathways as part of their adaptation option. This necessitated a comprehensive feasibility assessment to establish the most practical options in different context in The Gambia. This technical brief looks at EbA practices based on community preferences, gender choices, values and incentives, potential enablers and barriers, as well as policy and institutional frameworks based on findings from the EbA project in The Gambia<sup>1</sup>.

## **Key Messages**

- To ensure that EbA practices have a positive impact, the preferences and priorities of communities is crucial.
- Gender-specific preferences play an important role in the choice of EbA options at community level.
- For EbA to make sense, activities should generate social, economic and environmental benefits.
- Understanding existing enablers and barriers is crucial in the implementation of EbA practices.
- The impact of policies and institutional settings on the feasibility of EbA options must be carefully considered during the design and implementation stages.

<sup>1</sup> Large-Scale Ecosystem-Based Adaptation in The Gambia River Basin: Developing a Climate Resilient, Natural Resource-Based Economy is a flagship project funded by the Green Climate Fund and implemented by the Government of Gambia in partnership with ICRAF which provides technical guidance and support for the implementation

# **Policy Implications**

- To ensure feasibility, it is important to engage the communities during the inception stages of developing EbA options. People's voices help in building impactful options that address their livelihoods and ecosystem needs, as well as promoting their buy-in into the project. The community engagement process also helps in establishing values and priorities
- Gender considerations are essential when designing feasible practices. In many instances, men and women have different preferences that are largely informed by their preferred livelihood and ecosystem engagement; thus, including both genders in the choice of feasible EbA practices enhances inclusivity.
- There are various intrinsic or extrinsic conditions that either enable or hinder feasibility of different EbA options. These should be factored in right from the development stage. It is also essential to establish which options are affected by which enablers and barriers.
- The policy and regulatory context are crucial considerations when developing feasible options. These include factors such as values and incentives, engagement by different players and sectors, as well as mainstreaming options with the national and global processes such as the National Adaptation Plan (NAP) and Sustainable Development Goals (SDGs). It also involves establishing measures to create awareness and ensuring participation by community members.



Figure 1. Map showing the regions of The Gambia where the EbA project is being implemented (Source: EbA project)

# Background

Majority of the population in The Gambia lives below the poverty line; hence, their capacity to cope with the negative effects of climate change is very low. IPCC (2014) reports that populations living in the Least Developed Countries (LDCs), such as The Gambia, are the most susceptible to climate change and its variability effects such as erratic rainfall and perennial floods, which have resulted in low crop yields.

To address this challenge, the government has initiated a range of policies and strategies to improve the ability of the community to adapt to changes and absorb shocks. Such initiatives include the large-scale EbA project that aims to build a climate-resilient natural resource-based economy by rehabilitating over 10,000 hectares of degraded landscapes and improving the lives of over 11,000 people in The Gambia.

The Adaptation, Livelihoods and Ecosystem Planning Tool (ALIVE)<sup>2</sup>, version 1.0 was adopted to facilitate participatory development of EbA options for selected Gambian landscapes. The tool was modified to effectively capture livelihood strategies, associated ecosystems, climate change impacts and potential ecosystem-based adaptation options. Training on the tool was then conducted for technical persons from the Departments of Forestry, Community Development, Agriculture, Parks and Wildlife Management. Gender-disaggregated groups comprising 15 men and 15 women from every community forest area were involved in Focus Group Discussions (FGDs) which aimed at coming up with appropriate EbA options. Following this, both groups came together to combine their rankings. Later, the resource mapping team identified the intended locations for the activities. The proposed EbA practices were subjected to a comprehensive eight-point criterion modified from the ALIVE Tool to assess their feasibility as summarized in Table 1.

Table	1: Eight-point	criterion use	d in	feasibility	/ anal	ysis
-------	----------------	---------------	------	-------------	--------	------

Feasibility attributes	Description
Affordability	Cost-effectiveness in the long- term
Technical feasibility	Ability to implement the option based on size, location, capacity, possible externalities
Political feasibility	Political acceptability and policy implications
Implementation and maintenance cost	Possibility of meeting financial costs in the long run
Ease of monitoring	Ease of observing progress over time to make the right decision
Flexibility	Can easily respond to feedback and learning
Number of beneficiaries	Number of livelihoods supported and changed by the given option. Supports many beneficiaries
Cultural and social appropriateness	Consistent with cultural norms and beliefs in implementation

Each criterion was scored from 1 to 3, with 1 being the least and 3 being the most preferred score for feasibility. The aggregate feasibility score was computed by adding up individual criterion scores with the maximum score being 24. The results were disaggregated by gender in the Central River Region – North and South (CRR-N & CRR-S), Upper River Region (URR), and Lower River Region (LRR). An example of a participatory feasibility assessment exercise that was conducted for men and women, and the EbA practices ranking results is presented in Photo 2.







Photo 2. Ranking of EbA practices by men and women groups (Photo credit: EbA Project)

## **Key Findings**

## **Proposed EbA practices**

The most frequently mentioned EbA practices are summarized in Box 1. The summary excludes some activities that were mentioned less frequently across the 25 community forest groups engaged in the process without necessarily following the order of priority.

The proposed options, both by women and men, scored above the threshold score, which was 8 out of the

maximum 24. This indicates that they are all feasible if properly implemented and monitored. Further analysis of EbA was conducted to determine the most common options which the groups considered feasible. After the aggregate feasibility score was computed, it was converted to a percentage scale, using data from the 25 community forest groups in all four regions of the country. Figure 2 presents the results of the most preferred options by both men and women.

#### Box 1: General EbA practices proposed

- 1. Enrichment planting/assisted natural regeneration: Introduction of valuable tree species in degraded forests without eliminating valuable species that are already present
- 2. Establishment of woodlots: Woodlots are plots of wood grown for some specific purpose, e.g., for supply of timber or firewood.
- 3. Farmland restoration: The process through which an abandoned or degraded farmland is returned to a more productive state.
- 4. Vegetable gardening: The growing of vegetables and fruits on a small plot for human consumption.
- 5. Establishment of tree nurseries: A nursery is where seedlings are propagated and grown to the desired age.
- 6. Water pond establishment: An area filled with water that can be used for various purposes, such as irrigation and fishing.
- 7. Beekeeping: The practice of raising and caring of bees so that honey can be harvested from them.
- 8. Ecotourism: Socially responsible travel to natural areas that promotes conservation.
- Wild fruit collection and processing: Involves collection, processing and packaging of wild fruits for human consumption.
- 10. Rice farm development: A flooded parcel of arable land used for growing rice.
- 11. Establishment of fire breaks: Gaps in vegetation or belts of fire-resistant species along forest peripheries established to control the spread of fire during the drier seasons.
- 12. Fodder production: The process of planting and packaging pasture for livestock.
- **13. Handicraft industry:** The manufacture of handicraft products such as beds, chairs, etc. to provide the much-needed income and employment opportunities.
- 14. Climate-smart agriculture: Modern farming options aimed at transforming and reorienting agricultural systems to effectively ensure food security in a changing climate.



Figure 2. The most preferred EbA practices by men and women in the project regions

#### Community-level feasibility perceptions of EbA practices

Both genders expressed similar perceptions on the feasibility of enrichment planting based on the past degradation experiences, as well as existing enabling conditions such as land availability in community forests, community protected areas, and private lands (Duguma et al., 2019). Ease of implementing the option also favored this choice. Beekeeping was also scored almost equally by both men and women, a factor that is partially attributed to the long history of beekeeping in The Gambia, the government's investment and incentivizing beekeeping as an enterprise. Further, the sector also has the potential to increase farmers' earning and diversify their livelihood. It can also be easily maintained and developed by either gender. Food processing was also scored almost equally by both men and women, with women's score being slightly lower. Women are mostly assigned to unskilled and manual tasks in the processing industries while men are given skilled and technical roles (Devi & Somokanta, 2016). However, each gender can fit perfectly into the food processing practice.

#### Gender-influenced feasibility perception

In climate-smart agriculture, men's feasibility score was higher compared to that of women. This can be attributed to factors like unequal control over land resources, low access to agricultural inputs and extension services, and less access to labor. Women also ranked nature-based enterprises more highly than men. These involve activities such as weaving, and sale of handicrafts and fruits, which are mostly associated with women involved in small-scale enterprises. The men ranked water resource management and conservation higher compared to women, who are often excluded from decision-making processes in water management activities. Men also enjoy more rights and access to water resources within the community compared to women.

More women than men prioritized vegetable gardening. Vegetable gardens are usually located within the homesteads, making it easier for women to manage (Sigdel & Silwal 2018). Duguma et al. (2019) established that vegetable gardening was largely practised during the dry seasons by women as a coping mechanism, but had immense potential to generate income if properly done using a community group model as opposed to the individual gardening approach.

Nursery management was more highly ranked by women. Although both men and women are involved in the management of trees and tree nurseries, women end up doing most of the work, especially in the nurseries. They actively take part in the site and seed preparations, watering and general preparation of the nursery.



#### Box 2: A case study of Konkoba Community Forest

Figure 3. Proposed EbA practices by men and women in Konkoba Community Forest

Konkoba Community Forest covers an area of 210 hectares within the Lower River Region. Agricultural and forest lands are major ecosystems that support diverse wildlife, agricultural and related activities with supporting services from the surface and ground water. However, the effects of climate change have reduced the functionality of the major ecosystems over the years. The area is home to 220 households with 1,222 men and 1,320 women (The Gambia Bureau of Statistics & ICF International, 2014) a population that is likely to have increased significantly since 2013. In the Konkoba Community Forest as shown in the graph above, there are options that men think are feasible, but were not mentioned by women, and vice versa. Women mentioned that fishing is feasible, but men did not mention it. This can be attributed to the fact that fishing in this community forest is practised on a small scale and is normally carried out near homesteads with minimal investment. It therefore makes it easier for women to take part in it when compared to men who are always away from home. Sheep fattening is highly ranked by women, but men do not mention it at all. Fattening involves housing and feeding of the sheep within the homesteads, an activity that is a best fit for women since they spend most of their time around the homesteads. Men, on the other hand, are more involved in herding of livestock which involves moving from place to place in search of pasture. Beekeeping and nursery management was only mentioned by the men's group. This could be because of the existing history which shows that this is a sector which was once purely male dominated. It can also be attributed to the fact that women have limited access to information and resources related to this approach (Nieuwenhuis & O'Connor, 2000). Tree nursery management is only mentioned by the men's group, and this can be attributed to the fact that women have limited access to information and resources related to this approach. However, both men and women acknowledged that options like climate-smart agriculture, handicrafts, vegetable gardening and enrichment planting are feasible if properly implemented. Based on this experience, it is notable that any plan to implement EbA practices should take the variations into account to avoid selection of biased practices.

#### Enterprise options for the preferred EbA practices

From the study, it is evident that the EbA practices must generate values and incentives. These can be achieved by establishing enterprise practices that create employment and income sources to support communities of practice. Table 2 summarizes several options that can be created from the EbA approach.

Table 2: Enterprise options for various EbA practices

Ecosystem-based adaptation options	Related nature-based enterprises
Enrichment planting, assisted natural regeneration, land restoration	Tree nursery establishment to sell seedlings and trees
Vegetable gardening	Growing of fruits and vegetables for sale, fruit and other planting material orchards
Beekeeping	Honey and wax processing
Fodder/pasture plantation	Establishment of feedlots and feed packaging
Establishment of woodlots	Firewood and timber processing enterprises
Rhun palm plantation	Handicraft enterprises
Ecotourism	Ecotourism products such as nature walks, camping
Water ponds	Sale of fish and fingerlings, commercial rice production

Table 2 suggests that different ecosystem-based adaptation practices can attract different nature-based enterprise pathways. For example, the community can choose the development of tree nurseries as an enterprise to support rehabilitation of degraded community forests and agricultural lands through initiatives such as enrichment planting and assisted natural regeneration. Through such an enterprise, the community not only benefits from the restored ecosystems, but they gain income and employment from the process, a pathway that generates values and incentives for them.

Vegetable gardening, an option that was largely suggested by women, can achieve both food security and generate a reliable source of income for the household. It is widely applicable to both rural and urban areas since it is easy to establish and manage, and creates values and incentives that every community member can relate to (i.e., food provision). Beekeeping also ranked highly as an EbA practice and has wide applicability from a nature-based enterprise point of view. Honey and beeswax are among the main products that come from beekeeping, which can be used for enterprise options such as processing and packaging honey and processing honey wax products such as candles and soap. The fodder and pasture plantation option is linked to the establishment of fodder, feed packaging and marketing as an enterprise. The changing rainfall patterns and increasing temperatures have had a negative impact on livestock keeping, especially during the dry months. Therefore, establishing feedlots can contribute to sustaining livestock and at the same time promote income generation and employment creation.

Establishing woodlots as an EbA practice has the potential to generate income and create employment through firewood and timber sale enterprises. Over the years, unsustainable extraction of timber and wood products from community forests and protected areas have contributed to the degradation of these resources; hence woodlots can serve to bridge the gap by providing the products, promoting restoration exercises and at the same time promote income generation. The community also saw plantation of Rhun palm as an ideal EbA option which has the potential to develop and promote handicraft enterprises. This species is mostly felled for construction timber (Duguma et al., 2019), and developing an enterprise model through handicraft enterprises could reverse the trend. Promotion of its planting and controlled harvesting could contribute to its sustainability. In addition to handicraft enterprises, the species can also contribute to food security through its edible parts, e.g., leaves and fruits.

On conservation of water resources, development of ponds was mainly mentioned as an ideal option. The ponds contribute to enterprise development through rearing of fish species for food and sale, as well as rearing and sale of fingerlings. Further, it can be a possible source of water for rice production, which can be a major source of revenue and alternative food supply with the current changes in weather patterns. The communities also mentioned ecotourism activities such as nature walks, camping and ecotourism centres, as a source of income and at the same time, a way to conserve the degrading ecosystems. Ecotourism activities have the potential to contribute up to an estimated USD 5,000 annually if well harnessed (Duguma et al., 2019); this could transform the local economy and generate massive employment opportunities locally, in addition to conserving and educating visitors on the community's social values.

# Barriers to EbA Implementation and Relevant Enablers

Some of the key enablers include accessibility to land and availability of high quality seeds and seedlings. Options such as enrichment planting, assisted natural regeneration and agricultural land restoration with their corresponding enterprises of tree nursery establishment, require accessible land with the right soils and constant water supply. Some of the potential barriers to successful implementation include intrusion by domestic animals and wildlife, and theft and bush fires that could destroy newly planted and growing seedlings and trees. Aligning EbA practices to community values is also a key enabler to effective implementation. Income diversification through vegetable gardening, woodlot and feedlot establishment, and beekeeping also requires several sets of enablers. These include the right skills and capacity by communities to establish them and their related enterprises, support from the community and a favorable policy framework for establishment and growth.

Financial factors can also be a major barrier towards establishment of successful enterprises such as fruit processing. Notably, some enterprises such as ecotourism are capital-intensive and require time before the business can breakeven. This means that practitioners should have an alternative source of income as the business develops.

Legal instruments including policy and institutional frameworks could either be barriers or enablers to EbA implementation. For example, inadequate policy on the amounts of firewood or timber that can be harvested and poor institutional framework to control the harvesting process can lead to overexploitation of natural resources, consequently crippling woodlots as a nature-based enterprise. Water ponds established for fish and rice production require enough land, water sources and inputs such as rice seeds and fingerlings as enablers. Lack of these inputs at the right quality and quantity can be a major hurdle in the EbA implementation process.

# Policy and Institutional Context on EbA Implementation

The feasibility of EbA options is, to a significant extent, determined by the prevailing policy and institutional framework. Strengthening existing policy and institutional networks, and establishing new ones where there are gaps, is crucial in the development and implementation of EbA options and their related enterprises. The legal framework plays a regulatory role in EbA implementation by creating an enabling environment, identifying values and incentives, and mainstreaming associated activities with local, regional and national institutional structures.

Multi-sectoral engagement of different stakeholders is essential in strengthening policy and institutions. These include the national government, local governments, community members and groups, as well as nongovernmental organizations operating within a given area. The process aids in addressing existing policy gaps, enhancing technical capacity at different levels, and mainstreaming local policies (such as the community management plans) with national plans, policies and processes (Nzyoka et al., 2019). Effective implementation of EbA practices and related enterprises requires aligning available resources and stakeholders with the existing policy and institutional framework. In The Gambia, for example, the National Forestry Action Plan, Gambian Forest Management Concept, National Adaptation Programme of Action (NAPA) and National Adaptation Plan (NAP) are among the ideal platforms to anchor EbA practices options and the associated enterprise options. Multisectoral approaches also help in reducing possible trade-off in varying interests from different sectors. To manage such externalities, bringing together the various sectors together is critical.

Policies and institutions guiding the EbA options and related enterprises development must also generate values and incentives for them to make sense to the communities. This can be achieved when the options and enterprises are properly localized to meet community needs and choices at the lowest levels, including gender preferences and sociocultural dynamics. Further, they should add values such as income generation and employment creation. Policymakers should promote policy and institutional awareness among the public and build their capacity to engage in the processes at both local and national levels.

## **Insights for Practitioners**

EbA is a people-centered approach; hence understanding societal views and choices remains crucial. Despite the fact that EbA embodies nature-based solutions, largely capitalizing on ecosystems (biodiversity and ecosystem goods and services), there is a strong need for community buy-in if the EbA practices are to be implemented on a sustainable basis. The choices, preferences and buy-ins are also required from sector-level strategies and plans. That is why EbA, in effect, is about the system (the people, the policies, the institutions and the ecosystem at large). If not, effectiveness of EbA remains contestable, considering past experiences of failed interventions that aimed at improving livelihoods and environmental management.

Choices and preferences are largely influenced by previous experiences, control over the practice and its benefits, as well as capacity to manage it and make it work. The disparity between men and women is largely a reflection of these influences. As such, consideration of the gender variables is critical for practitioners seeking to implement EbA practices effectively.

#### **References**

- Devi W, Somokanta T. 2016. Gender, Technology, and Work: Case of Women Employees in Selected Food Processing Industries in Manipur, Gender, Technology and Development. *Gender, Technology and Development*, Vol. 20, No.1: 81-104
- Duguma L, Borona P, Minang P. et al. 2019. Baseline Study Report for the Large-scale Ecosystem-based Adaptation Project. Nairobi: ICRAF
- Nieuwenhuis M, O'Connor N. 2000. Challenges and Opportunities for Small-scale Tree Nurseries in the East African Highlands. Unasylva 203, Vol. 51. Online copy http://www.fao.org/tempref/docrep/fao/x8080e/x8080e09.pdf (Accessed 14 December 2019)
- Nzyoka J, Duguma L, Borona P, Minang P, Bah A, Foundjem D, Gilruth P, Carsan S. 2019. Overview of the Readiness Capacity to Implement Ecosystem-Based Adaptation Interventions in The Gambia. Nairobi: ICRAF
- Sigdel U, Silwal U. 2018. Gender Role in Commercial Vegetable Farming (CVF) in Chitwan District, Nepal: A case study of Gunjanagar and Sharadanagar CVDs. *International Journal of Agricultural Extension and Rural Development Studies*, Vol. 5, No. 2: 29-40
- The Gambia Bureau of Statistics (GBOS) and ICF International. 2014. The Gambia Demographic and Health Survey 2013. Banjul, The Gambia and Rockville, Maryland, USA: GBOS and ICF International.

**Citation:** Duguma L, Duba D, Muthee K, Minang P, Bah A, Nzyoka J, Malanding J. 2020. Ecosystem-based Adaptation Through the Lens of Community Preferences. ICRAF Technical Brief No. 01/2020. World Agroforestry, Nairobi, Kenya.

**Acknowledgement:** This technical brief was produced by ICRAF as an output of the project, 'Large-Scale Ecosystem-Based Adaptation in The Gambia River Basin: Developing a Climate Resilient, Natural Resource-Based Economy'. The project is funded by the Green Climate Fund and implemented by the Government of The Gambia with support of the United Nations Environment Programme (UNEP).



World Agroforestry United Nations Avenue, Gigiri PO Box 30677–00100, Nairobi, Kenya Phone: + (254) 20 7224000 Via USA phone (1-650) 833-6645

Email: worldagroforestry@cgiar.org Website: www.worldagroforestry.org







RESEARCH PROGRAM ON Forests, Trees an Agroforestry