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Harnessing Ecosystem-based Adaptation To Address the Social Dimensions of Climate Change

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HARNESSING ECOSYSTEM-BASED ADAPTATION

To Address the Social Dimensions of Climate Change

by Richard Munang, Jesica Andrews, Keith Alverson, and Desta Mebratu

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African Savanna.

The 2011 droughts in the horn of Africa deprived countless communities of water and food security. Two years later, devastating floods in Germany caused widespread urban destruction. These events showcase the early signs of dangerous climate change, which is already threatening the livelihoods, health, and well-being of millions, especially the poor and vulnerable who lack the financial, technical, human, and institutional resources to adapt to these changes.

The new June 2013 report T*urn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience* (released by the World Bank) warned that African food production will be hit by more frequent and more extreme heat waves and droughts if climatic changes continue at their current pace. It noted that while not removing the risk altogether, the worst impacts can be avoided if the temperature rise is kept under 2°C. This requires that comprehensive plans to adapt communities to climate change are put in place. However, even if this change is kept under 2°C, regional poverty reduction efforts and economic growth could potentially slump as crop yields drop and water access problems are exacerbated. For example, the median yield of all crops is expected to be reduced by 11% at 2°C. This is expected to further increase to over 20% if warming reaches 4°C. Perhaps more devastating is that the length of the crop growing period would also be shortened by 20% across the whole region if warming reaches 4°C. Climate change of as little as 2°C will lead to worse health for many people across Sub-Saharan Africa, while any subsequent increases in undernourishment, growth stunts in children, and malaria and other diseases could impact the ability of children to receive a proper education, and the ability of large segments of society to make a living.

The stark statistics from this report and others are a resounding reminder of where we are headed if urgent adaptation strategies are not pursued. Millions of people around the world could be pushed back into poverty as climate change threatens economic development in poorer countries. In both developing and developed countries, governments, organizations, and individuals have been forced to recognize the urgent need to respond to the diverse challenges of climate change. This is in addition to solving the enormous social challenges of poverty alleviation, social inequality, resource insecurity, and high unemployment. Now more than ever, a comprehensive approach to environmental, economic, and social problem solving is needed.

Ecosystem-Based Adaptation Approach—A Panacea?

In June 2012, for the first time, global leaders explicitly recognized ecosystems as the core element in addressing climate change impacts and paving the way toward achieving sustainable development. However, questions regarding the types of strategies, approaches, and actions required still generate divergent views from the international community. A logical approach, gaining great momentum, uses the natural environment to adapt to climate change and maintain our life support systems through what is called Ecosystem-based Adaptation (EbA).

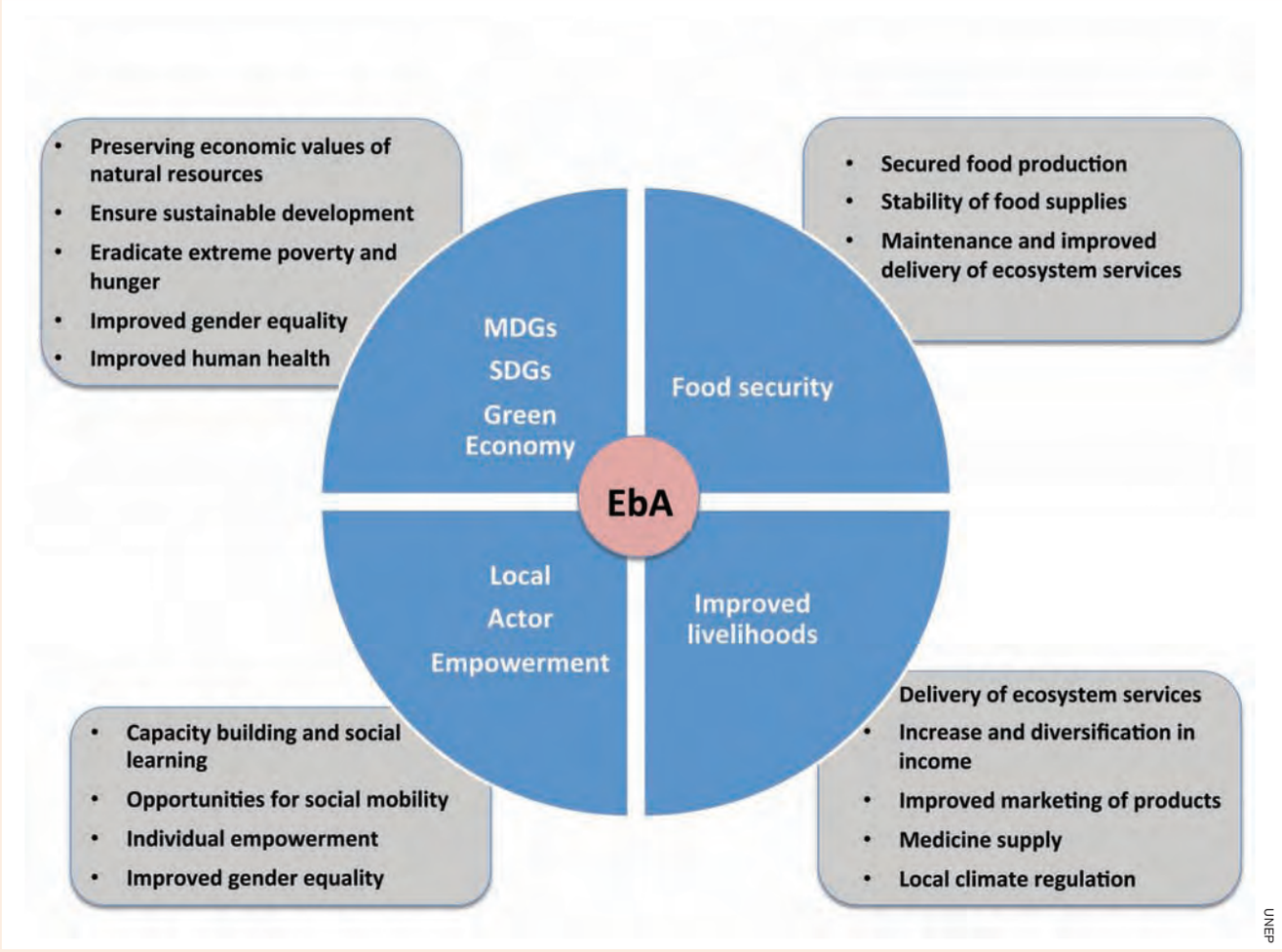
EbA is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people and communities adapt to the negative effects of climate change at local, national, regional, and global levels. It responds to this complex array of challenges by integrating the pursuit of sustainable social benefits for the local community within successful climate change adaptation practices. EbA is a comprehensive way of dealing with climate change adaptation, where integration between issues is the key element. As such, EbA takes a holistic, interdisciplinary approach that recognizes the interconnectivity between ecological, social–cultural, economic, and institutional structures.

EbA From a Global Perspective

Adaptation is needed to deal with rising sea levels, droughts, and floods brought by climate change. However, there have been increasing calls to move

WRI/Chris Reij

In 1985, the village of Ranawa's land was barren, but it has since been planted in a more sustainable manner.



Social impacts of ecosystem-based adaptation (EbA) on national, regional, and local themes.

away from adaptation measures based on man-made infrastructure, such as sea walls, to approaches that involve more natural solutions. Preserving ecosystems can help meet adaptation needs, such as disaster risk reduction, food security, sustainable water management, and livelihood diversification. For example, in the Maldives,[1] where around 80% of the islands are only 1 meter above sea level, the use of marine protected areas to conserve reefs would help protect against the impact of tropical storms. It is estimated that this would cost US$34 million (€25.6 million) initially and US$47 million (€35.3 million) to maintain, but would generate US$10 billion (€7.5 billion) per year in benefits from protecting the islands and their valuable tourism and fishery industries.

For ecosystem-based adaptation to be fully effective, it must be integrated into decision making. The United Nations Environment Programme (UNEP) addresses climate change through its ecosystem-based adaptation program, which has three main components. First, it supports countries to assess impact and vulnerability. This involves analyzing ecosystem services for adaptation potential and economic value to allow decision makers to design and implement ecosystem-based adaptation policies. Second, it provides support for implementing ecosystem-based adaptation through technological development and piloting ecosystem-based adaptation projects, especially in developing countries. Lastly, UNEP's program helps integrate ecosystem-based adaptation into national adaptation plans that establish organizations to mobilize stakeholders.

Unleashing the Hidden Benefits of EbA in Africa: Examples from Countries

To mitigate the effects of climate change and address the social, economic, and environmental dimensions in Africa and elsewhere, cost-effective measures need to be taken without delay. In Togo, for example, a project using ecosystem-based adaptation helped in the rehabilitation of water reservoirs

in the savannah region for the benefit of women and youth groups, in addition to boosting the cereal and vegetable production of the entire community.

Before the project began, nongovernmental organizations (NGO) and government divisions partnered with civil society organizations (CSOs) to train outreach specialists and develop a public awareness campaign with the goal of involving the local communities in project design and implementation. Thorough planning that considered the local context allowed the project to build upon local capacities. As a result, not only has access to water improved and countless social benefits been achieved, but also the local populations are now prepared to take an active role in developing future resilience efforts.

The EbA approach increased the capacity of women and youth groups to contribute to work in irrigation and crop-related employment. This has generated increases in the self-sufficiency and social inclusion of these groups while achieving improved agricultural benefits.

The involvement of women and youth groups has led to a rise in year-round agricultural production. Increases in production during the dry season have also been realized with stored water available for irrigation. Greater participation and the ability to irrigate have led to intensified crop diversification, which combats the risk of crop failure. Ultimately, the use of EbA has moved the community toward greater social inclusion as well as greater food security.

The revitalized reservoirs also generated long-term prospects to utilize the stored water. The rehabilitated reservoirs now support opportunities in brick construction, market gardening, and fisheries. These "spin-off" industries allow for reduced unemployment, while the diversification of opportunities for employment allows for upward social mobility. Overall, the EbA project in Togo was successful in establishing a more prosperous community and, at the same time, increasing the community's resilience to the effects of climate change.

Targeted Small-Scale Investment—Big Economic and Environmental Return on Investment (ROI) in Togo

This US$100,000 investment revitalized infrastructure, increased the volume of water stored, and markedly increased crop yields. For example, under rain-fed conditions, tomatoes yield was about 19 tons per hectare; those same fields, now irrigated, yield about 30 tons per hectare (a 50% increase).

Yet even with the increase, this is still below-average production. Production can be further improved through management and seed selection, to rates between 45 and 50 tons per hectare. In the rehabilitated Togo dams, 94,000 m3 of the stored water has been utilized to irrigate 30 hectares of vegetables. Some vegetables, like tomatoes, are planted at least two times in one year. If the average tomato yield is 30 tons per hectare, farmers are harvesting at least 1,800 tons of tomatoes per year as a direct result of access to the rainwater stored in the dams. The ability to irrigate fields

Togolese women engage as EbA project members.

CC DARE

has led to increased incomes through the sale of produce and employment in field irrigation.

Due to water availability, trees and other vegetation have also been planted. This has slowed down the hydrologic cycle, allowing water time to seep into aquifers instead of running straight to the oceans to evaporate back to the atmosphere. Runoff water harvesting in the dams has reduced land degradation by decreasing soil erosion caused by excess accumulation of surface runoff during the rains. Water stored in the dams has raised the groundwater table through seepage. This has resulted in vegetation regrowth, which is vital in mitigating climate change.

More Examples of EbA from Countries in Africa

In Uganda, a project promoting agroforestry, barrier crop use, and conservation agriculture resulted in more fertile soils and increased yields. This in turn reduced time and cost in preparing land for farming, leaving more time available for diversification, for instance, into livestock rearing. The project also resulted in less use of agrochemicals and improved biodiversity. Seventy-five thousand people benefited from the project. In addition, 31,272 tree seedlings have been planted to enhance the ecosystem and boost household investment in the short and medium term. The encouragement of chili (*Capsicum annuum*) barrier crop production earns poor households about $60 per week during the off-peak season and about $240 per week in the peak season. The ability to generate surplus incomes from their agricultural practices has dramatically contributed to the food security of these households, all while improving efficiency and encouraging better agroforestry practices.

In Burkina Faso, farmers are utilizing the ecosystem-based adaptation approach through digging small planting pits called *zaï* on barren, degraded land and filling them with organic matter, adding nutrients to the soil where they sow their crops. They are also constructing stone lines (called contour bunds) on their farmland to slow down water runoff, prevent erosion, and assist in recharging the groundwater. These water-harvesting techniques have allowed farmers to restore completely degraded land to much higher levels of production. Since the mid-1980s, it is estimated that farmers have rehabilitated 200,000 to 300,000 hectares of quasi-unproductive lands, producing an additional 80,000 to 120,000 tons of cereals on their lands. These simple water-harvesting techniques have produced a co-benefit: an increase in the number and diversity of on-farm trees.[2] The manure that farmers use in the planting pits contains seeds of trees and bushes that were eaten by the livestock. Besides cereal crops, trees also grow in the pits and along the stone

A completed EbA reservoir in Togo. CC DARE

bunds. When farmers protect and manage these seedlings, new agroforestry systems emerge—a process known as "regreening." These regenerated trees and bushes play a key role in restoring the productivity of degraded farmland and provide multiple benefits: fodder for livestock; fruit, firewood, and poles for construction; a more agricultural-friendly microclimate; improved soil fertility; higher groundwater levels; and decreased soil erosion. In years of average rainfall, farmers implementing these practices have produced 1,000 kg of cereals on 1 hectare from lands that were previously barren.[3] And, in years of poor rainfall, farmers who implement these practices are relatively better off than those who don't.

Sustained Social and Environmental Achievements

Developing the community's resilience to the impacts of climate change improves the wellness of the entire ecosystem. EbA can accelerate income gains, improve health, and secure food production, all while ensuring the sustainable development of local resources. This is of particular importance to vulnerable populations that lack basic shelter and sanitation or access to alternative income sources.

The Togo project with others highlights the multifaceted successes that can be achieved through EbA and delivers a model of how local communities can be involved in the implementation of adaptation measures. Better yet, it provides a good understanding of the communities and their perceptions and capacity to respond to the impacts of climate change.

EbA can create new industries that result in increased social mobility while providing the surrounding community with consistent year-round access to water. The increased and consistent access to water provides for the stable and improved production of food and has advanced sanitation efforts, which contribute to better overall health of the nearby communities.

WRI/Chris Reij

Burkina Faso - Ousséni Kindo and his agroforest in October 2008.

In the end, EbA practices can more efficiently contribute to climate change adaption while responding to other essential needs outlined in the Millennium Development Goals and the alleviation of contemporary food security challenges. The success of the UNEP project in rehabilitating the two reservoirs has motivated the government and other institutions to finance more rehabilitation as well as the construction of new reservoirs to increase water availability for multiple uses, many of which will focus on social benefits.

CARE/Annet Kandole

A barrier crop (chilli) grown around Kibale National being dried for sale. It deters wild animals from raiding crops.

Constraints and Limitations

As with most development projects, the success of EbA depends largely on involving the local community in the planning and implementation process, while bearing in mind the overall political context and any present land use conflicts. This is particularly true as EbA often requires large patches of previously productive land to be set aside for restoration purposes. But by demonstrating the long-term benefits of this type of adaptation it is possible to build support from the local community. Open communication, an inclusive approach, and respect for the traditional land rights of affected local communities are all essential for both the future resilience of the community and for achieving EbA goals.

It is also important to include local knowledge in planning processes at the regional and national levels. As well as providing useful insights, incorporating local viewpoints can facilitate community-based management of adaptation measures, which has been shown to improve their success. Identifying "local champions" could help raise awareness and enthusiasm, but in most cases this is not done.

In addition to improving participation, the language around EbA can cause confusion and limit its understanding and in turn its use. The term "ecosystem-based adaptation" is relatively new and needs to be better understood by the general public and especially by policymakers. Better evidence is also needed to support and encourage EbA use. At the moment this is currently lacking. There is a need for continued monitoring and evaluation to better quantify EbA's benefits and the effects of climate change on ecosystems, and for a more detailed comparison between EbA and other adaptation strategies. With more knowledge, these approaches can be better applied to provide smarter solutions.

There can also be a lack of enabling policies. A good example to illustrate this is the case study from Burkina Faso. Despite the positive changes in the productivity of people's land and in the lives of their families, much work needs to be done as there are a lot of obstacles still in place to upscale this great success story. The country's weak legal framework doesn't protect farmers from the appropriation or destruction of their efforts, threatening the agricultural gains they've made thus far. For example, farmers in Burkina Faso don't have legal rights to the trees that grow on their property. Policy changes could provide for this ownership, allowing ecosystem-based adaptation approaches to expand.

Harnessing the adaptive forces of nature is economically viable and effective in combating the impacts of climate change. Its potential for synergies with other adaptation methods, climate mitigation strategies, and development goals warrants a prominent place for EbA.

The Future of EbA

Effectively meeting the challenge of climate change will require a compromise of workable approaches of monumental proportions by all countries. Seizing the current window of opportunity to utilize EbA offers a cost-effective mechanism for coping with future environmental change and ensuring climate-resilient development in Africa and elsewhere. The successful completion of practical EbA projects has played a crucial role in building local capacity to address social, economic, and environmental dimensions, while positively influencing local and national government policies.

The bottom line is that the EbA adaptation project in Togo, Uganda, and Burkina Faso focused on the benefits perceived by the local community and the national government. This in turn allowed for opportunities for job creation, income generation, and livelihood diversification while building resilience and positive environmental effects. Harnessing the adaptive forces of nature is economically viable and effective in combating the impacts of climate change. Its potential for synergies with other adaptation methods, climate mitigation strategies, and development goals warrants a prominent place for EbA in both the national and international funding mechanisms.

Indeed, although EbA still remains underutilized by policymakers and associated stakeholders, it provides a viable strategy for pursuing development goals simultaneously with climate change adaptation and mitigation targets. Although tailoring EbA approaches to the local environment is of unparalleled importance—especially across a continent as vast as Africa—the lessons learned from Togo can offer a guiding vision to proactively addressing social vulnerability and the impacts of changing climate.

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NOTES

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