

Sustainable Living in Rural Villages

A guide for Village Natural Resource Managers





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Developed to facilitate Restoration at Scale in the Tana Delta under The Restoration Initiative



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BACKGROUND

This guide is developed to support forest landscape restoration in the Tana Delta under the Global Environment Facility Project 'Enhancing integrated natural resource management to arrest and reverse current trends in biodiversity and land degradation for increased ecosystem services in the Tana Delta'. The United Nations Environment Programme as Implementing Agency and Nature Kenya as Executing Agency are cooperating in the implementation of this project for the period 2019 to 2024. The restoration actions in the Tana Delta provide lessons that are aimed at up-scaling to cover five other counties in Kenya. The lessons include formation and support of Village Natural Resource and Land Use Committees (VNRLUCs), who are now on the forefront in adopting and championing wise use of natural resources in their respective villages. The guide will be applied by Nature Kenya across all the sites where Nature Kenya is working across the country where Site Support Groups are implementing site-based conservation actions.



PHOTO M. ADAMJEE

The project targets to restore 44,813 ha of riverine forests; 3,939 ha of mangrove forest; 10,000 ha of degraded landscapes; at least 10,000 ha of agricultural and pastoral land; and 2000 ha of waterways and wetlands. The project also aims to promote sustainable land management across 130,000 ha of land that is under sustainable livestock, fish and crop management. This includes at least 20,000 ha of cultivated land that had recently been converted into rice farms by the Tana and Athi River Development Authority and 116,867 ha of Indigenous and Community Conservation Areas (ICCAs) that were recently set up in the Tana Delta

To achieve these sustainable land management and restoration targets, approaches that can facilitate restoration at scale are needed. Planting a tree or a grass one by one is not only cost ineffective but time consuming. In the Tana Delta, Nature Kenya is piloting restoration at scale that is driven by the people for the people in villages. To organize and coordinate restoration efforts, 45 Village Natural Resource and Land Use Committees (VNRLUCs) have been set up. There is a plan to increase these to a target of 100 villages in the delta and beyond.

The VNRLUCs are the nucleus of change, working as restoration champions. They receive training and pass this training to the village members. They inform and mobilise the villagers to collect seeds and sow these seeds in areas targeted for restoration. They create awareness to promote sustainable land management. These committees support the work of Community Forest Associations (CFAs), Water Resource Users Associations (WRUAs) and Beach Management Units (BMUs) who besides direct sowing of seeds, also produce tree seedlings in nurseries.

This guide will be applied by Nature Kenya in the Tana Delta and also across all the sites where Nature Kenya is working across the country where Site Support Groups are implementing site-based conservation actions. The lessons will be shared to inform county and national restoration initiatives and targets towards a 10% tree cover for Kenya.

The guide is divided into four Parts:

Part 1: Ecosystem Services and Threats

Part 2: What to Restore

Part 3: Who will Restore

Part 4: How to Restore

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A Wood Sandpiper at the Tana River Delta. PHOTO P. USHER



Herders grazing their cattle at the Tana River Delta. PHOTO COURTESY OF BIRDLIFE INTERNATIONAL

PART ONE

Ecosystem Services and Threats

The air we breathe, water we drink, food we eat, clothes we wear, shelter we build and beauty we see, come from the environment. The natural environment includes the sun and the stars; the air, soil and water; animals and plants and other living things; and people. The environment also includes the interactions between all the parts of the environment - the ways in which they affect each other.

These interactions occur everywhere, including villages. In olden times villages were mobile - could be moved to new places. This happened after people could not get enough resources to sustain their needs. Today, most villages are permanent - they do not move. People are also permanent - they stay in one place. However, livestock can move outside and back to the village.

If the natural environment is damaged, people suffer because they lack basic services that are provided by healthy villages. A healthy village is one that is able to give people their basic needs: fertile soils for food production, vegetation for pasture and browse, medicine, firewood, thatch and construction timber, bees that pollinate crops and provide honey, water for people and livestock and birds and wildlife that improve the beauty of the village. These services are for the presently living people; but their children and their children's children will need to access the same services in the same way as they are accessed today - sustainably. The people who live in the village are expected to ensure these services are maintained for posterity.

This guide aims to help people living in rural villages implement actions that restore and maintain the services provided by those villages for present and future generations.



Tana River. PHOTO M. ADAMJEE

Services that people get in a rural village

Provisioning Services



FOOD

Crops, wild foods, honey, spices



WATER AND WATER PURITY



ENERGY

such as fire wood, charcoal, solar power



BIODIVERSITY

A variety of plants and animals that form the pleasant surroundings of a village



MEDICINAL RESOURCES

such as herbal medicines



RAW MATERIALS

including timber, thatch, fuel wood, organic matter, fodder, browse, dyes, fertilizer



ORNAMENTAL RESOURCES

such as handicrafts, jewellery, decoration

Cultural Services



RECREATIONAL

including ecotourism, outdoor sports, bird and wildlife viewing



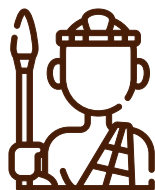
THERAPEUTIC

Recent studies prove green spaces promote mental health



SPIRITUAL AND HISTORIC

Religious, cultural and natural heritage



CULTURAL

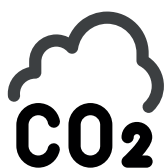
Folklore and sacred sites



SCIENCE AND EDUCATION

Use of natural systems for school excursions and scientific discovery

Regulating Services



**CARBON
DIOXIDE
SEQUESTRATION**
and climate regulation



PEST CONTROL
for example, vultures
clean carcasses (dead
bodies) from the
environment.



FLOOD PROTECTION
Forests absorb water, store the water
underground and release the water
slowly throughout the dry season. This
avoids flash floods which also cause
soil erosion. Mangroves protect the
shore from storms.



**PURIFICATION OF
WATER AND AIR**

Air from a forest is clean for breathing. Water
from a well is filtered by soil. Water that
emerges from a wetland such as a swamp is
filtered by plants.



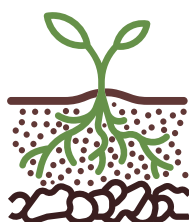
**WASTE DECOMPOSITION
AND DETOXIFICATION**

Bacteria cause wastes to decompose.
Toilets take a long time to fill because
waste is consumed by bacteria.

Supporting Services



**PRIMARY
PRODUCTION**
Pasture, fodder and
browse and foods



**NUTRIENT
CYCLING**
Nitrogen fixing plants
and bacteria



**SOIL
FORMATION**
The Tana Delta
continues to form
with every flood.



POLLINATION
Bees and other
insects pollinate
crops

Threats facing village services

Provisioning Services

- Soil erosion and land degradation is leading to hunger.
- Over harvesting of sea organisms to feed increasing human population is leading to less sea food.
- Loss of natural vegetation due to over removal of vegetation cover is leading to less timber, fire wood, herbal medicine, wild foods and honey.



Heavily grazed grassland in Tana Delta. PHOTO P. USHER

- Overgrazing due to overstocking is causing degradation, leading to less fodder, browse, organic matter.
- Loss of forest is leading to reduced water quantity and quality, less irrigation potential, less hydro power and charcoal.
- Loss of wetlands is leading to reduced water quantity and quality, loss of pasture, loss of thatch and other materials, and loss of cultural and ornamental resources.
- Land degradation – loss of forest, wetlands, grasslands, bushland – is leading to loss of the variety of plants and animals that support our environment and human well-being.



Charcoal for sale in Tana Delta. PHOTO G. ODERA

Regulating Services

- Loss of vegetation cover is leading to increased climate change such as warmer climates and rainfall variability caused by carbon dioxide and other gases trapping heat around the Earth.



A non-designated livestock watering point at the banks of River Tana. PHOTO G. ODERA

- Loss of forest cover is leading to increased floods caused by less ground water storage. Wells are drying up in the dry season and soil erosion is increasing, leading to poor crop production and less fodder.
- Destruction of large trees and forests means loss of nesting sites for vultures leading to reduced carcass removal from the environment. Diseases of livestock, dogs and perhaps people will increase.
- Loss of vegetation is leading to loss of water filtration services.

Cultural Services

- Loss of nature due to human activities reduces the connection between people and nature that sustains culture and heritage.

Supporting Services

- Land degradation due to poor land use is leading to poor soil formation. This reduces primary productivity, so there is less pasture, fodder and browse, and low crop yields due to loss of pollination services.

Village Ecosystem Services and Threats



PART TWO

What to be Restored in a Village

Restoration revolves around soil, trees, grass, bushland, and trees on farm. Plants sustain life on earth and provide a direct source of food, water, jobs and environment protection. Some of the values of forests and vegetation that we know about today include:

1. **Water:** Forests catch, store, clean and release water. By trapping and absorbing water, forests reduce flooding. By storing and releasing water, forests reduce the effects of drought.
2. **Energy:** Forests produce wood, which may be used as firewood or charcoal. Water from forests flows to hydro-electric power plants, producing electricity.
3. **Soil conservation and fertility:** Trees enrich the soil and protect it from erosion. This means less silt in rivers, dams and the sea, and better soil for farmers.
4. **Air quality and environmental services:** Forests help to moderate the climate. Near forests, hot days are less hot, and cold nights less cold, than in open areas. By storing carbon dioxide, forests help to regulate the gases in the atmosphere around the earth. This helps to slow down climate change.
5. **Timber:** Forest trees produce wood and poles for houses, furniture, fences, paper, tools and works of art. Certain special trees are used to make products for religious or cultural ceremonies.
6. **Non-timber forest products:** These include medicinal plants, gums and resins, fibres for ropes, seeds for ornaments, fruits and honey from forest flowers.
7. **Biodiversity:** In Kenya, 50% of all the different kinds of trees, shrubs and woody vines are found in forests. And 40% of large or medium-sized kinds of mammals, 35% of butterflies and 30% of bird species live in forests. (Yet closed-canopy forests are only 2% of the land area!).



An African Honey Bee pollinating flowers . PHOTO D. MARTINS

8. **Tourism and recreation:** Forests are cool, shady, pleasant places to visit and walk in. Local and foreign visitors come to see wildlife, landscapes, birds or butterflies, and young people like to camp, hike or bike in forests.
9. **Sacred spaces:** Many forests are sacred places to local communities. Some forests are the sites of religious or cultural ceremonies, for example the coastal Kaya forests.
10. **Drought refuge:** Traditionally, pastoralist peoples conserved forests, in order to use them for grazing in times of drought. They moved the cattle out of the forest once the drought was over.
11. **Other services:** Activities in forests provide employment to neighboring communities, and forests are important sites for education and research.

Restoration is a direct contribution to livelihoods. A healthy and functioning village is one whose ecosystem is healthy, providing villagers with their day-to-day life support. Livestock is dependent on grass, browse and water. People need food produced from fertile soils when it rains or through irrigation. Human shelter is dependent on clay or timber for construction and grass for thatch.

To know what to restore in a village, the Village Natural Resource and Land Use Committee (VNRLUC) needs to meet and list everything they know people get from forests, mangroves, bushlands, grasslands, wetlands, cropland, soil and the land in general. As a guide, some of the uses of the village resources can be selected from the list below. Therefore the village supported by the Village Natural Resource and Land Use Committee (VNRLUC) needs to target to restore the following services:

Provisioning Services

Pasture, browse and fodder
Timber
Firewood
Charcoal
Medicinal plants
Thatching grass
Building poles
Mkindu leaves
Food
Fish
Honey
Mushrooms
Wild fruits
Palm wine
Water
Clay

Biodiversity Habitats

Forests
Mangroves
Bushlands
Grasslands
Wetlands
Farmland

Plants

Trees
Shrubs
Grasses
Wetland plants

Birds

Coastal Birds
Wetland Birds
Terrestrial birds

Mammals

Hippos
Primates
Antelopes

Reptiles

Amphibians

Insects

Bees
Butterflies
Other pollinators
Insects that prey on pests
Earthworms
Soil micro-organisms

Regulating Services

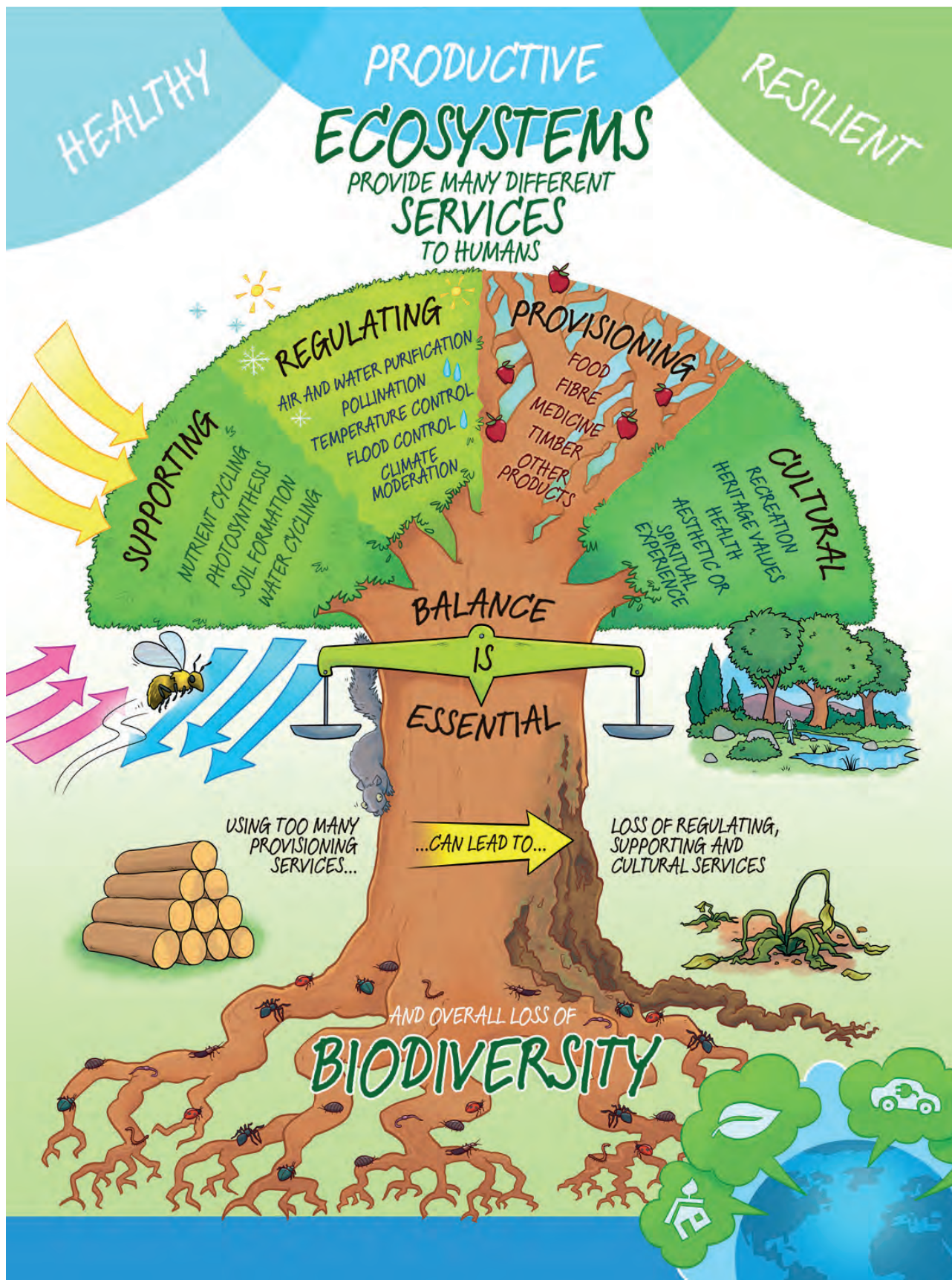
Fertile soil
Pollination
Fresh air
Climate regulation
Carbon sequestration
Water cycle
Flood control
Soil quality
Soil erosion control
Coastal protection
Biological control of pests and diseases
Waste water filtration

Cultural Services

Beautiful landscape
Cultural sites
Recreation, enjoyment
Cultural ceremonies
Spiritual experiences

Supporting Services

Production of atmospheric oxygen,
Soil formation and retention,
Nutrient cycling
Water cycling





A healthy mangrove and dune forest near Kipini, Tana Delta. PHOTO P. USHER

PART THREE

Who Will Restore?

Land Users

Restoration is done by people in the village who use the land and resources, including:

- Livestock keepers and herders
- Cultivators
- Resource harvesters or collectors (fish, timber, fire wood, water, etc.)
- Irrigators
- Herbalists
- Builders
- Handicraft makers
- Traders
- Worshippers

Every villager has a role to play in restoration. Restoration principles applied here include wise land use. Wise use is considered to mean using land-based resources in a way that allows future

generations to access the same resources in the same proportions as they are accessed by the present generation.

Does the government have a role in restoration?

Yes. However, the government will not restore land. The government will make it possible for land users to restore land. The government may do any of the following:

- Make policies, laws, rules, strategies and action plans to reduce destruction or to facilitate restoration.
- Provide finances for removal of barriers that prevent land users from restoring land.
- Provide incentives to business or private sector to encourage them to restore ecosystem services. These may include tax rebates or relief, etc.

Land users should not wait for government to restore the land that they depend on for daily living.

Leadership for restoration at village level

A lot can be achieved through individual responsibility, especially where land title is held individually. Where land is held communally, it is critical to avoid the so-called 'tragedy of the commons'. This happens where the resource is held communally but smaller units such as individuals or families or clans or even tribes use it as much as they want. Nobody is in charge. Everyone agrees the resource is being depleted but no one is able to provide leadership. This is the case in the Tana Delta.

Tana Delta Conservation Network (TDCN)

Someone who cares needs to catalyze village-based ecosystem services restoration. In the Tana Delta, Nature Kenya works with the Tana Delta Conservation Network (TDCN). The TDCN is a federation of over 38 user groups in the Tana Delta. These groups include:

- Herders
- Cooperatives for crop and livestock production
- Fisher folks
- Beach Management Units (BMUs)
- Water Resource Users Associations (WRUAs)
- Community Forest Associations (CFAs)
- Women groups

The TDCN, being a grassroots organization, is best placed to catalyze village-based restoration and provide the link between village-based restoration efforts and county-level operations. The TDCN can engage the county government staff including agronomists, veterinary officers and fisheries officers to support restoration efforts at village level.

The TDCN can also provide a link with private sector who may be interested in investing in the access and use of Delta resources, as well as external civil society organizations that wish to support local community conservation and development efforts. The TDCN will be a player in the sustainable management of Delta land and land-based natural resources. As such, user groups at village level need to join the TDCN network. And the TDCN itself needs to develop a conservation and development strategy that will support the user groups to restore ecosystem services by engaging in forest landscape restoration and other wise use objectives.

Village Natural Resource and Land Use Committees (VNRLUC)

Coordinating restoration efforts in a village needs a form of leadership, such as a Village Natural Resource and Land Use Committee (VNRLUC). The process for setting up a VNRLUC may include the following:

- Call a meeting or baraza at the village level, announced through village elders, the Assistant Chief and the Chief of the area.
- Inform villagers of the need to set up a committee with the following core objectives and functions:
 - Create awareness on wise land use.
 - Identify and inform villagers about areas that are degraded and are in need of restoration.
 - Identify land use and resource extraction approaches and techniques that contribute to land degradation.
 - Identify and communicate to the villagers about illegal removal of forests, mangroves, trees of particular significance and careless clearing of vegetation.
 - Create awareness on protection and conservation of wildlife species in the villages.
 - Promote appropriate stocking of livestock to match available pasture or fodder to avoid overgrazing.
 - Set targets of acres or hectares that need to be restored.
 - Choose methods of restoration for each site: good land management; setting aside; reducing grazing; or active restoration.
 - Classify the area to be restored as forest, mangroves, bushland, grassland, farmland or wetland.
 - Monitor actions taken and report back to the village through public barazas convened by the area administration, including village elders, Assistant Chief and area Chief or others.
 - Collaborate with the county government and other stakeholders to promote wise land use in the village.
- Request the village baraza or meeting to nominate women, men and youth to form the VNRLUC.
- Convene a meeting of the Committee to agree the terms of reference, frequency of meetings, chairman, secretary and treasurer.
- Register the Committee with the appropriate government department as a Self Help Group. It is possible for a VNRLUC to register as a CBO or NGO if the members desire.



Developing of a village resource map at Bura Kofira village, Tana Delta. PHOTO G. ODERA

PART FOUR

How to restore?

Training

Convene a meeting of the Village Natural Resource and Land Use Committee (VNRLUC). Discuss and agree on a schedule of meetings to agree objectives for restoration. Invite county extension officers (agronomists, veterinary, wildlife and fisheries officers, foresters, water managers, and others) operating in the region. They will provide knowledge on restoring farm lands, grazing and fodder areas, fishing waters, forests, wildlife and water sources, among others.

Set restoration targets

The VNRLUC to convene a meeting to:

- Discuss what area of each type of land use will be targeted for restoration
- Agree appropriate restoration approaches
- Identify areas that require active tree planting, or regulated use, or need to be set aside without certain uses for a defined period of time. These

include crop lands, wildlife corridors, grazing lands, forests (mangrove, riverine, dryland), bush lands, grasslands, water ways and lakes.

- Develop a sketch of village resource maps: grazing lands, crop lands, fishing areas, areas for timber, fuel wood, watering livestock, fetching water for domestic use, herbal medicine and others.

Agree basic restoration protocols

The VNRLUC to convene a meeting to:

- Develop basic operational rules and protocols to be popularized in the village to guide land users on cutting trees, clearing bushes, commercial ventures for timber and fuel wood, farming, grazing and other land uses
- Agree on how to report and how to react when villagers observe members violating rules or protocols on resource use.
-

Create awareness

The VNRLUC to reach out to the villagers through village baraza opportunities including:

- Churches and Mosques
- Village elders' meetings
- Chief or assistant chief barazas
- Other meetings.

During these meetings, request opportunity to talk to villagers about sustainable land management to ensure humanity's future is assured.

Develop village restoration action plan

It is critical that villagers don't wait for external players or partners to come and help them to restore their land. Villagers can and must take up wise land use as part of ensuring life on earth continues throughout their future generations. Future children need to find fertile soils for food production, clean water for humans and livestock, trees for shade, timber, and firewood, grass for grazing or thatch, bees for crop pollination and honey and herbs for medicine, among others.

Birds need to continue their biological functions to control insects and other pests, disperse seeds and pollinate trees, as they provide therapeutic services

to humans through their songs and beauty. A rainy season without frogs singing or insects flying around our homes does not align with human cultures and well being. Humans thrive best in a system that is complete: forests, bushland, grasslands, water ways, birds, insects, frogs, bees, butterflies and many others.

The restoration action plan to include the following sections:

- Provisioning services: what people get from land
- Current uses of provisioning services
- Threats and pressures affecting each of the services
- What is preventing restoration?
- Village-led actions to restore or maintain the service
- Who should take action
- When action should be taken
- What will it cost (time, money, policy, regulation)
- Rules and protocols to be followed
- Enforcement of the rules for maximum compliance
- Reporting violation of rules
- Conflict management.



A village restoration action plan meeting at Bura Kofira village, Tana Delta. PHOTO G. ODERA

Some actions to be considered for inclusion in Village Restoration Action Plans

Provisioning Services	Possible actions to include in the restoration action plan
Livestock pasture, fodder and browse	<ul style="list-style-type: none"> • Keep livestock at appropriate stocking level • Avoid overgrazing • Collect grass seeds and plant the seeds in the wild for grass to germinate • Ask government to provide seeds to restore degraded areas • Implement dry and rain season grazing regimes • Plant grass on farm, e.g along terraces
Timber and building poles	<ul style="list-style-type: none"> • Collect tree seeds and plant them where trees have been cut • Use live fencing for home compounds • Explore and propagate native plant species that are effective as hedges for fencing homes • Plant indigenous trees as stock for future use as pole wood • Establish tree nurseries • Make bricks or stabilized blocks for house construction • Sensitize the Community on appropriate harvesting of poles for construction of houses
Firewood	<ul style="list-style-type: none"> • Use energy saving stoves • Use cooking gas (LPG) • Plant indigenous trees • Stop commercial firewood collection • Seek alternate livelihoods for commercial firewood collectors • Form groups to establish tree nurseries, e.g CBOs, youth groups, self-help group • Recruit, train and deploy community rangers • Use Community sensitization and Stakeholder collaboration and coordination to reduce destructive firewood collection
Medicinal plants and Herbal medicine	<ul style="list-style-type: none"> • Establish herbal botanic gardens at village level, planting the medicinal plants that can be propagated • Map medicinal plants near the village and train herbalists on sound harvesting techniques • Establish tree nurseries targeting particular species of medicinal value, and plant them in the wild and on farm • Establish household woodlots and gardens for medicinal plants
Thatching grass	<ul style="list-style-type: none"> • Identify and secure areas with thatching grass to encourage natural regeneration • Create awareness on the different species of thatching grass and seed collection methods • Promote cultivation and trade in thatching grass • Liaise with research organizations to re-introduce species of thatching grass that have disappeared locally
Charcoal	<ul style="list-style-type: none"> • Avoid commercial charcoal making • Improve the methods of producing charcoal for domestic use • Do not cut whole trees to make charcoal • Stop all forms of commercial charcoal making by people who come from outside the village • Insist on No charcoal transportation in, within or through the village • Establish and register Charcoal Producer Associations (CPA)

Landscapes	<ul style="list-style-type: none"> • Protect existing forests, wetlands, bushlands and grasslands • Plant indigenous fruit trees • Restore degraded areas
Fish	<ul style="list-style-type: none"> • Use recommended fishing gears • Avoid destruction of fish breeding areas • Avoid catching sea turtles and under-sized fish • Enforce fishing Laws and policy, including the Fisheries Act. • Teach farmers to avoid soil erosion and reduce the use of fertilizers and pesticides that pollute the water
Honey	<ul style="list-style-type: none"> • Invest in beekeeping with modern beehives for livelihood improvement • Reduce or regulate the use of pesticides to give bees a chance to live and thrive
Mushrooms	<ul style="list-style-type: none"> • Learn to propagate edible mushrooms • Collect edible mushrooms for domestic use and for sale
Wild fruits	<ul style="list-style-type: none"> • Protect existing forests, bush lands and grasslands • Plant indigenous fruit trees
Palm wine	<ul style="list-style-type: none"> • Plant palm trees to ensure supply
Food	<ul style="list-style-type: none"> ▪ Apply best innovations for soil conservation to stop soil erosion • Reduce the use of pesticides and fertilizer • When land becomes degraded, help it to regenerate ▪ Grow crops suited to the local climatic conditions • Apply appropriate farming techniques such as inter cropping, zal pits, rotational cropping, etc.
<i>Mkindu</i> – Palm tree leaves	<ul style="list-style-type: none"> • Establish palm nurseries • Weave the palm fronds to add value
Meat and protein	<ul style="list-style-type: none"> • Start chicken rearing or rabbit rearing and use livestock as protein • Establish fish ponds to increase protein content in diet • Explore traditional ways of eating edible insects
Skins	<ul style="list-style-type: none"> • Treat livestock skins to add value • Establish Cooperatives to boost trade in skins • Sensitize the Community on traditional beliefs that discourage trade in skins
Water	<ul style="list-style-type: none"> • Develop village rules to reduce desertification • Develop village rules to keep water sources clean and fresh • Plant trees along the riverbank • Do not plant trees on seasonal wetlands • Use crop farming methods that stop soil erosion • Stop or reduce the use of inorganic fertilisers and pesticides that pollute water ▪ Establish livestock water access routes and plant trees and grass along the routes • Establish or build watering points for livestock • Regulate the agricultural investors in the Delta to ensure they treat the environment with respect



Planting trees to rehabilitate a degraded area. PHOTO NATURE KENYA ARCHIVE



Mangrove seedlings ready for planting. PHOTO NATURE KENYA ARCHIVE

Biodiversity services	Possible actions to include in the restoration action plan
Plants	<ul style="list-style-type: none"> • Ensure the village has green spaces – trees for shade and fruits, flowers for pollinators, grass for walking or resting • Take stock of which plants have cultural, medicinal, scientific or commercial value • Collect seeds, establish nurseries and seed banks, and plant indigenous trees in the wild
Forests	<ul style="list-style-type: none"> • Protect existing forests • Protect existing riverine forests • Protect all standing trees • Establish tree nurseries • Plant indigenous trees in degraded areas of the forest • Recognize that fungi and wildlife play important roles in a natural forest • Establish Community Forest Associations to support forest restoration • Develop participatory forest management plans and sign these with the Kenya Forest Service and County Government • Engage, train and deploy local community volunteer scouts • Encourage every community member to harvest trees sustainably • Avoid forest fires
Mangroves	<ul style="list-style-type: none"> • Protect existing mangroves • Protect existing riverine forests • Establish tree nurseries • Plant mangroves and trees in degraded areas of the mangrove forest • Establish Community Forest Associations to support forest restoration • Develop participatory forest management plans and sign these with the Kenya Forest Service and County Government • Engage, train and deploy local community volunteer scouts • Encourage every community member to harvest trees sustainably • Avoid forest fires
Bushlands	<ul style="list-style-type: none"> • Protect existing bushlands • Protect existing riverine vegetation • Establish tree nurseries to grow trees and shrubs • Plant trees and shrubs in degraded areas of the forest or bushland • Establish Community Forest Associations to support forest restoration • Develop participatory forest management plans and sign these with the Kenya Forest Service and County Government • Engage, train and deploy local community volunteer scouts • Encourage every community member to harvest trees sustainably • Regulate fires on bushlands
Grasslands	<ul style="list-style-type: none"> • Keep appropriate stocking level for livestock • Avoid overgrazing • Harvest seeds and plant the seeds in the wild for grass to germinate • Ask agricultural extension or livestock officers to provide grass seeds to restore degraded areas • Implement dry and rain season grazing regimes • Plant grass on farm, e.g along terraces

Wetlands	<ul style="list-style-type: none"> • Protect wetlands and their biodiversity • Allow seasonal wetlands to fill during the rainy season and dry out during the dry season • DO NOT plant trees in wetlands • Plant trees along the riverbank • Build watering points for livestock • Use appropriate crop farming methods to stop soil erosion • Stop or reduce use of inorganic fertilisers and pesticides that pollute water • Establish livestock water access routes and plant trees and grass along the way • Regulate the agricultural investors in the delta to ensure they recognize and respect the environment
Farmland	<ul style="list-style-type: none"> • Stop soil erosion • Grow crops that are compatible with the local climatic conditions • Apply appropriate farming techniques including inter cropping, zai pits, rotational cropping, etc. • Apply best innovations for soil conservation • Plant trees for shade and fruits, flowers and shrubs for pollinators • Upkeep paths for easy walking
Birds	
Coastal Birds Wetland Birds Terrestrial birds	<ul style="list-style-type: none"> • Appreciate birds • Establish village bird watching clubs • Conduct annual bird counts in different habitats • Protect nests for breeding birds • Stop poisoning of birds for whatever reason • Buy guide books and binoculars from Nature Kenya • Ask Nature Kenya to train in bird watching • Develop a checklist of birds and local books about birds • Develop bird tourism for enjoyment and income
Mammals	<ul style="list-style-type: none"> • Establish a community conservancy to protect wildlife
Primates	<ul style="list-style-type: none"> • Some monkeys are destructive – ask KWS for advice to keep them away • Some monkeys are harmless, rare and globally Endangered – protect their forests and develop monkey-viewing eco-tourism
Reptiles	<ul style="list-style-type: none"> • To avoid snakes, do not keep chickens, or grain that attracts rodents, in your house • Explore indigenous ways of keeping snakes away from homesteads • Do not collect crocodile eggs without a permit from KWS
Amphibians	<ul style="list-style-type: none"> • Do not pollute the river and water ways
Insects	<ul style="list-style-type: none"> • Reduce or stop the use of pesticides to avoid killing bees, other pollinators and predatory insect • Keep beehives for honey and for pollination • Plant flowers and flowering bushes for pollinators • Recognize that many insects prey on or parasitize insect pests • Revive traditional ways of eating suitable insects • Explore ways of raising insects for fish food

Regulating Services	Possible actions to include in the restoration action plan
Maintain soil fertility and control soil erosion	<ul style="list-style-type: none"> • Restore natural habitats such as grassland or forest • Use best innovations for soil conservation • Use best agricultural practices like inter cropping, zai pits, rotational cropping • Grow crops that are compatible with local climatic conditions
Pollination	<ul style="list-style-type: none"> ▪ Do not use pesticides to levels that will kill bees and other pollinators ▪ Keep beehives for honey and for pollination ▪ Plant flowers and flowering bushes for pollinators ▪ Plant bushes between fields of different crops
Maintain Fresh air	<ul style="list-style-type: none"> • Keep natural vegetation: conserve forests, mangroves, trees, bushlands, grass etc.
Regulate climate	<ul style="list-style-type: none"> ▪ Keep natural vegetation: conserve forests, wetlands, mangroves, trees, bushlands, grass, etc.
Carbon sequestration	<ul style="list-style-type: none"> ▪ Keep natural vegetation: conserve forests, mangroves, wetlands, bushlands, grass and marine environments
Regulation of water flow and flood control	<ul style="list-style-type: none"> • Conserve wetlands, forests, mangroves and marine environments • Build houses on higher grounds • Avoid settling close to the shores of rivers or lakes
Coastal protection	<ul style="list-style-type: none"> ▪ Protect and restore mangroves
Biological control of pests and diseases	<ul style="list-style-type: none"> ▪ Stop or reduce the use of pesticides ▪ Plant alternate rows of different crops • Use crop rotation ▪ Plant bushes between rows of crops
Waste water filtration	<ul style="list-style-type: none"> ▪ Protect and restore wetlands ▪ Let waste water sink into the ground rather than flow to water bodies

Cultural Services	Possible actions to include in the restoration action plan
Maintain beautiful landscapes	<ul style="list-style-type: none"> ▪ Plant trees, flowers, grass and upkeep paths
Maintain cultural sites	<ul style="list-style-type: none"> ▪ Recognize and protect cultural sites and shrines
Recreation and aesthetic enjoyment	<ul style="list-style-type: none"> ▪ Develop activities like bird-watching, insect study, photography, sound recordings, sharing experiences with other villages and with visitors
Cultural ceremonies	<ul style="list-style-type: none"> ▪ Respect most cultural ceremonies
Spiritual experiences	<ul style="list-style-type: none"> ▪ Recognize that nature is central to human well-being



*A degraded area of
lyale forest, Taita hills.*
PHOTO I. FRANCIS



*A community member
engaged in forest
restoration.*
PHOTO NK ARCHIVE



*A restored forest area
in South Nandi.*
PHOTO NK ARCHIVE



Tables to fill as part of the process for developing Village Restoration Action Plans

As a guide, once the village based ecosystem services are identified during the stakeholders consultation, the information may be organized to fit in the two annexes below.

Annex 1: Provisioning Services, current uses, threats/pressures and restoration barriers

Provisioning Services (These services may vary from village to village)	Current uses	Threats and Pressures	What is preventing restoration	Remarks
Livestock pasture & fodder				
Timber and building poles				
Firewood				
Medicinal plants and Herbal medicine				
Thatching grass				
Charcoal				
Landscapes				
Fish				
Honey				
Mushrooms				
Wild fruits				
Palm wine				
Food				
<i>Mkindu</i> – Palm tree leaves				
Meat				
Skins				
Water				
Biodiversity				
Plants				
Forests				
Mangroves				
Bushlands				
Grasslands				
Wetlands				
Farmland				
Birds				
Coastal Birds				
Wetland Birds				
Terrestrial birds				
Mammals				
Primates				
Reptiles				
Amphibians				
Insects				

Regulating Services				
Maintain soil fertility and control soil erosion				
Pollination				
Maintain Fresh air				
Regulate climate				
Carbon sequestration				
Regulation of water flow and flood control				
Coastal protection				
Biological control of pests and diseases				
Waste water filtration				
Cultural Services				
Maintain beautiful landscapes				
Maintain cultural sites				
Recreation and aesthetic enjoyment				
Cultural ceremonies				
Spiritual experiences				



An African Skimmer feeding at the Tana River Delta. PHOTO P. USHER

Annex 2: Provisioning Services, restoration actions, who and when to restore and cost

Provisioning Services (These services may vary from village to village)	Village led Actions to restore or maintain service	Who should take action	When action should be taken	What will it cost: time money, policy, regulation
Livestock pasture & fodder				
Timber and building poles				
Firewood				
Medicinal plants and Herbal medicine				
Thatching grass				
Charcoal				
Landscapes				
Fish				
Honey				
Mushrooms				
Wild fruits				
Palm wine				
Food				
<i>Mkindu</i> – Palm tree leaves				
Meat				
Skins				
Water				
Biodiversity				
Plants				
Forests				
Mangroves				
Bushlands				
Grasslands				
Wetlands				
Farmland				
Birds				
Coastal Birds				
Wetland Birds				
Terrestrial birds				
Mammals				
Primates				
Reptiles				
Amphibians				
Insects				
Regulating Services				
Maintain soil fertility and control soil erosion				
Pollination				
Maintain Fresh air				
Regulate climate				
Carbon sequestration				
Regulation of water flow and flood control				

Coastal protection				
Biological control of pests and diseases				
Waste water filtration				
Cultural Services				
Maintain beautiful landscapes				
Maintain cultural sites				
Recreation and aesthetic enjoyment				
Cultural ceremonies				
Spiritual experiences				



Restoration of riparian area. PHOTO G. ODERA

