SUPPORTING COMMUNITIES TO REGENERATE THE LOCAL ECOSYSTEM

WHAT IS ECOSYSTEM REGENERATION?

A community's land is its greatest asset. If well managed, it will help communities prosper and realize their goals: a community with rich forests, clean water, abundant wildlife and fertile soil will allow community residents to farm more productively, raise healthier livestock, hunt more animals, and more easily pursue their land-based livelihoods. A community with abundant natural resources may also allow families to sell surplus natural resources for a profit and earn extra income. Yet a community with a depleted ecosystem will have trouble farming in arid soils, will not have enough fodder for livestock, will face fuel shortages and increasing erosion, and will have to buy a number of necessary natural resources on the local market, thus further impoverishing local families. Farmers may have to pay a great deal of money for fertilizer and pesticides, which may then run into the waters and negatively impact community members' health.

Efforts to revitalize a community's local ecosystem are investments in the productivity and value of the land — and the community's future wealth and prosperity. For these reasons, community land protection efforts should not end when lands are documented and local governance is strengthened: **a community should also be guided to plan and carry out strategies to help the local environment thrive and flourish**. This process is sometimes called "ecosystem regeneration." It may also be called "agro-ecology" or "permaculture"; as related to grazing lands, it may be called "holistic rangeland management."

"Sustainable" natural resource management is the practice of people using land in such a way that nature can regenerate itself at its own pace.

Ecosystem regeneration is a process of humans actively ***helping*** the environment to flourish and thrive. Such actions and efforts enable nature to regenerate at a much quicker pace.

HOW DOES ECOSYSTEM REGENERATION WORK?

Generally, if the local community takes no affirmative action — leaving a piece of degraded land unused, or using it sustainably — nature will take its own slow path to regenerate the environment, which may take decades. However, humans can support nature's process by proactively tending to the land in such a way that will create higher fertility and biodiversity in a few ***years***, rather than a few ***decades***.

When communities take action to regenerate their ecosystem, humans become a positive force, dedicating their energy to giving back to the environment and supporting nature to thrive —- rather than only taking from it and depleting resources. Facilitators can support communities to brainstorm activities they can do to regenerate their lands and natural resources according to local traditional knowledge. Facilitators (or local experts) can also introduce a variety of new ideas and practices to communities. While every region on earth has its own specific ecosystem, there are a few ecosystem regeneration techniques that can be adapted and applied to most ecosystems. These include:

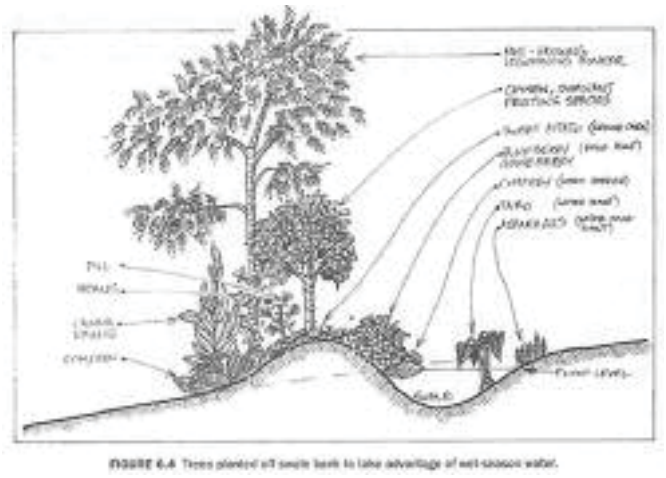
Before and after ecosystem restoration, Loess Plateau, China.

1. **Reforestation.** Reforestation is process of planting trees to replenish forests and woodlands that have been depleted. Reforestation can be used to increase the fertility of the soil by preventing erosion, help regenerate ground water (below the surface), increase soil moisture, help rebuild natural habitats and ecosystems, and reduce the amount of time that community members spend gathering firewood. Communities can easily— at no or low cost —gather local trees' seeds and begin a tree nursery to grow the seeds into seedlings, then plant and care for them. Communities should make sure to grow and plant a wide variety of indigenous, local species of trees —the trees planted should ideally help return the community to the biodiversity of the past.
2. **Water catchment systems.** Water catchment is the process of gathering rain water and helping direct it to the places where the land and farmers need it most. Water can be collected from rivers or rainfall, then redirected into fields, or into a well, pond or small reservoir. The water collected can then be used to irrigate gardens and fields, or for livestock. Two simple strategies for water catchment techniques include:

- **Contour plowing.** Contour plowing is the practice of plowing and/or planting across a slope or incline, rather than parallel to it, which results in level crop lines that curve around the land. Most land has at least a slight incline: in contour farming, farmers use the incline of the land to catch rainwater by creating rows that stop water from running down the slope. These contour lines create a barrier or "water break" that allows more time for the water to settle into the soil, reduces heavy water run-off, prevents flooding, and slows soil erosion. Farmers can increase the process of water catchment by placing stones along the contours.
- **Swales** are ditches and short walls that run along contour lines and make sure that any rainwater that falls runs ***into*** farmers' fields, rather than ***away*** from the fields. Swales can be created by digging a ditch along a field's contour line, and piling dirt and rocks on the downhill side of the ditch to create a small wall that directs water where the farmers want it to go. Farmers can also plant certain types of indigenous plants that do not take up a lot of water on top of these small walls to ensure that the walls do not erode, and to create shade to stop water evaporation.

THE GREENBELT MOVEMENT IN KENYA

Kenya's ***Greenbelt Movement*** was founded to respond to the needs of rural Kenyan women who reported that their streams were drying up, their food supply was less secure, and they had to walk further and further to get firewood for fuel. The Greenbelt Movement encouraged women to work together to grow seedlings and plant trees to bind the soil, store rainwater, and provide food and firewood. Within a few years, the women had planted more than 1000 seedlings in long rows to form "green belts" of tree. The "belts" of trees provided shade and windbreaks, supported soil conservation, and provided habitats for birds and small animals. The women planted trees during local tree-planting ceremonies/celebrations, and invited their communities to attend and take part. Since the Greenbelt Movement was founded in 1977, more than 51 million trees have been planted, and more than 30,000 women have been trained in forestry, food processing, bee-keeping, and other trades that help them earn income while preserving their lands and resources.



(left: swale, right: contour lines with swales) courtesy of Introduction to Permaculture by Bill Mollison, 1997.

3. **Restoring the health of the soil.** Over time, heavily-used soils lose many of the nutrients and microbes necessary for soil health and become less productive. Without necessary nutrients and microbes, plants more easily fall prey to disease and are more vulnerable to stresses like drought and insect damage. There are a number of different simple, no-cost strategies that farmers and pastoralists can use to increase the fertility of their soils. These include:

- **Planting cover crops**. A cover crop is a plant that is not grown for sale or food, but is used to slow erosion, improve soil health, and help control pests and diseases. Cover crops physically slow down how fast the rain hits the soil surface, preventing soil erosion. They also help anchor the soil in place and increase soil fertility by returning nitrogen and other nutrients to the soil. Farmers often plant a cover crop for a specific period of time, then plow the cover crop under the soil before the plants reach full maturity (which adds to the nutrients in the soil). After the cover crop has been plowed into the soil and allowed to decompose for a time, farmers can again plant food or crops for market.

- **Composting, mulching, and spreading manure**. Composting involves mixing farm and household organic waste (such as plants, leftover food and vegetables, weeds, etc.) in a pile or bin and providing conditions that encourage decomposition. The decomposition process turns the compost pile into rich organic fertilizer. Famers can keep all of their food or plant waste in one place, and, over time, turn it into compost or mulch. They can then apply the compost or mulch to the soil. Animal manure can also be used to add nutrients and organic matter to the soil and increase soil health. It is best to plow the manure into the soil before planting crops. To ensure against the spread of disease, all food grown in manure should be carefully washed before eating.

- **Polyculture and perennial crops**. Traditional agriculture is based on the idea of "monoculture" crops, which involve growing only one or two kinds of plants in a given area and exterminating all other species. Monocultures are not found in nature — they create an unbalanced ecosystem that can lead to plant disease, insect infestation, reduced soil fertility, and destruction of wildlife habitats. "Polyculture" is the practice of growing many different kinds of plants in one area. In most ecosystems, there are certain kinds of plants that like to grow together. It is good to include ***perennial plants*** in the polyculture. Perennial plants are plants that have living roots in the soil at all times. (They live for long periods of time and do not need to be replanted.) They therefore prevent soil erosion and help to keep soil healthy. Farmers may know of helpful indigenous perennial plants that will not interfere with crop growth to plant among their fields.

TRES HERMANAS

More than 1000 years ago in Latin America, indigenous communities developed a system of farming called ***"Tres Hermanas"*** or "Three Sisters." In this system, the seeds of corn, beans, and squash (pumpkin) are planted together in mounds or rows. As they grow, the bean vines climb the corn stalks as a frame, while the squash covers the soil with its large green leaves. The resulting gardens are dense, fertile, and beautiful. Growing the three crops together increases the soil fertility and ensures that all three crops thrive — even more than if they were each planted alone.

4. **Smart herding/holistic rangeland management**. Well-managed livestock can be a powerful force of land regeneration and prosperity. When well-managed, large herds of cattle, goats and sheep can bring benefits to soil and plants that cannot be achieved by plants on their own. Holistic rangeland management techniques were developed by watching the behavior of wild herds of animals: wild herds bunch into large groups as they graze, which protects them from predators. While they graze, these herds cycle nutrients (by eating and excreting them), transport seeds (as they eat and digest them), and enrich the soil with manure. Livestock's hooves break the hard upper crust of the soil, which allows it to absorb water and breathe more easily, enabling more plants to seed and grow. They also compact the soil under their hooves, which helps ensure that seeds get pushed down into the soil and can germinate.

   Large herds of wild animals must constantly move to fresh ground in order to get enough to eat (a short grazing period on each area). They cannot return to ground they had previously passed over until it has regrown a sufficient amount of vegetation to sustain the herd again (a long recovery period). To achieve the benefits of holistic rangeland management, communities seeking to regenerate grazing lands for domestic livestock must carefully manage their herds to mimic wild herds' behavior: keeping many animals bunched together into a tight group and herding them over small areas of land in a planned way for a short period of time (a few days), instead of letting the herd spread over a vast area and remain grazing for many days. After a herd has passed over the small area of land, the land should be left alone for enough time for seeds to root, grow, and create a plant that itself puts out seeds. Depending on the ecosystem, this can take anywhere from one to three months.

It is important to note that to regenerate their local ecosystem, farmers and pastoralists ***do not have to stop practicing their livelihoods***, or take on new obligations — they simply have to change how they go about farming and grazing their animals. Simple changes can dramatically improve the fertility and health of community lands.

TRADITIONAL KNOWLEDGE INFORMS ECOSYSTEM REGENERATION

Most of the strategies of ecosystem regeneration are derived from traditional knowledge from around the world. Local communities are often deeply interconnected with their natural surroundings, and over time have developed complex understandings of the properties of local plants and animals, the dynamics of their ecosystems and how to manage them, as well as how to nurture and cultivate wild and domesticated foods and medicines. Many of the techniques described above were originally created by local people who simply paid attention to natural systems and observed what made certain areas thrive. Over thousands of years, experimenting with simple, no-cost strategies, people figured out how to make their lands very fertile.

Ecosystem regeneration efforts create an opportunity for elders to remember their ancestors' traditional knowledge and teach them to the entire community. Local youth may then have great ideas about how to innovate such ideas further, then pass these revived and improved techniques onto their own children. When a community revitalizes its traditional knowledge for regenerating the soil and creating a flourishing ecosystem without external inputs and expensive technology, it regains power and control over its economy and sets a course for a prosperous future.

HOW TO FACILITATE A COMMUNITY TO EMBRACE ECOSYSTEM REGENERATION TECHNIQUES?

To support community-led ecosystem regeneration, facilitators can convene special meetings to help communities brainstorm and plan for how they will take action to revitalize their local environment. Facilitators can convene ecosystem regeneration meetings at any time throughout the community land protection process, according to community needs and interests.

Because facilitators may not have experience teaching ecosystem regeneration techniques, it is best to **develop alliances with experts that have technical knowledge in the areas of permaculture, integrated soil management, holistic rangeland management, and water catchment**. There are organizations that focus on ecosystem regeneration in most countries; facilitators should do research to find those organizations, then invite their field staff to come teach interested communities. University professors and their students may also have this knowledge. Facilitators can also ask government agricultural extension workers to come teach ecosystem regeneration strategies.[1]

Then, during an ecosystem regeneration meeting, facilitators and any invited technical experts can:

1. **Link ecosystem regeneration techniques to the community's future vision and all future planning efforts**. Facilitators might open the ecosystem regeneration meeting by asking community members to return to the visioning exercise: to remember what their local environment used to be like in the past, describe what the environment is like now, and then imagine what it will be like in the future if nothing changes. Through this quick visioning exercise, community members may become motivated to not only use their land sustainably, but also to actively work to restore the local environment's fertility and abundance.

2. **Show *before* and *after* photos of successful ecosystem regeneration efforts**. A picture speaks a thousand words. Community members living in degraded ecosystems may not be able to imagine that the environment has ever been different – or could ever be different within their lifetime. Facilitators should find examples (like the two sets of before and after photos in this chapter) and print them in color on large pieces of paper that can be passed around. Alternatively, facilitators could project a slide show of images related to ecosystem regeneration.

Critically, a community may be more willing to sell or lease land that has become infertile or exhausted. Yet when members of a community understand that their land can be infinitely regenerated and abundant, they can envision prospering from their land for many generations. This can help underscore the negative long-term impacts of selling or leasing their land to outsiders and motivate people to protect their land claims.

3. **Highlight/showcase local traditional knowledge**. Facilitators can then ask the community to brainstorm strategies that they *already use* to promote local biodiversity. Elders may have traditional knowledge of techniques that are locally appropriate and specific to the area. Facilitators should aim to draw out elders' memories of what the community used to do in the past to ensure that community's ecosystem flourished: elders may have memories from their own childhoods of what community members did to keep fields and grazing lands fertile. Local indigenous knowledge may be particularly helpful in identifying good cover crops and varieties of indigenous plants to use for reforestation or to promote soil fertility.

4. **Give a short overview of a variety of ecosystem techniques and let the community choose**. Again, photos or a slide show presentation can help community members visualize what is being described. After explaining a number of no or low-cost techniques that community members can use, facilitators should support the community to have a participatory discussion of what they would like to do, both within common lands as well as on their family farms. Eventually, the community should agree on a few of techniques they would like to try out. They may choose to try a technique in a specific small area before applying it more broadly, or they may choose to make larger changes to local practice immediately.

5. **Support the community to make a plan for how to begin implementing ecosystem regeneration techniques**. Once the community has chosen a course of action, it should make a plan for how to realize ecosystem regeneration. For example, the plan could include: 1) selecting a group of volunteers to get trained in a certain technique (who can then train other community members); 2) scheduling a training with experts from an ecosystem regeneration

1. If inviting a government agricultural extension worker, facilitators should screen them carefully to make sure that they have the right knowledge expertise — younger professionals may have learned ecosystem regeneration techniques in school, but older professionals may still promote the use of expensive chemical fertilizers and pesticides, etc.

/permaculture organization or agricultural extension worker; 3) selecting areas designated to be the site of a tree nursery, a man-made pond, or the location of "test sites" for holistic rangeland management, for example; 4) deciding on a work plan/schedule for how and when the work will be carried out; and 5) making a plan for how the group will report back to the community on any progress and results. Other community members could commit to less extensive ecosystem regeneration actions, like collecting and saving seeds and replanting traditional medicines, etc.

5. **Encourage knowledge sharing for household use**. Facilitators should suggest that everyone who attended the meeting return home and share what they have learned with their family, friends and neighbors. Certain individuals may be excited to try techniques on their own family land, then share their results with the wider community.

The first photo is from February 2004, the second photo is the same site taken in July 2009. Foundation for Ecological Security, India, Annual Report, 2013-2014.

ADDITIONAL RESOURCES

Overview. A brief introduction to the most important techniques in ecosystem regeneration is available at: http://sheldonfrith.com/2015/12/15/a-brief-introduction-to-most-important-techniques-in-regenerative-agriculture/. An associated recommended reading list can be found here: http://sheldonfrith.com/recommended-reading/

Water catchment. A short video on how local communities in India are using water catchment to restore their ecosystems and agriculture is available at: www.goodnewsnetwork.org/water-ghandi-of-india-honored/.

Water harvesting. Zephaniah Phiri Maseko's indigenous innovation of water harvesting in Zimbabwe is described here: www.muonde.org/wp-content/uploads/2013/11/The-Water-Harvester-2011-Travel-Africa-magazine-article.pdf. There is also a video here: https://youtu.be/ieqYZaT0JwA

Regenerative agriculture in China and Africa. This video, available at: www.youtube.com/watch?v=bLdNhZ6kAzo, shows that large decimated eco-systems can be restored. The video showcases success stories from Ethiopia, Rwanda and China. It is part of a series of videos about regenerative agriculture in many parts of the world called "What If We Change." There are more than 15 videos in the series, available at www.whatifwechange.org/magazine/, each set in a different location in the world. Most of the videos in the series focus on grassroots, local and indigenous communities taking action to restore their agriculture and local ecosystems.

Holistic Rangeland Management was pioneered by a man named Allan Savory. The Savory Institute has a number of resources, available at: http://savory.global/institute and www.ted.com/talks/allan_savory_how_to_green_the_world_s_deserts_and_reverse_climate_change#t-1321801. See also: http://sheldonfrith.com/2015/11/26/what-are-properly-managed-livestock/.