

SNAPSHOTS OF THE FUTURE OF FARMING

**Glimpses into regenerative and
innovative farming**



Contents

Regenerative agriculture.....	3
Regenerative agriculture - key characteristics	4
Snapshots of regenerative agriculture and other pioneering approaches	5
Sustainable Agriculture Tanzania.....	5
Rotational grazing in the US: White Oak Pastures	7
China: high welfare pig production	8
Community Supported Agriculture, China.....	8
Water harvesting in Ethiopia: Improving the lives of people and farm animals.....	9
Chickens producing both meat and eggs for small-scale farmers in Africa	10
South Africa: Angus McIntosh	11
Turning away from the grain merchant can boost farmer incomes	12
Arakunomics: a vision for India focusing on regenerative agriculture and healthy food	12
Brown's Ranch, North Dakota	13
Redesigning agriculture in nature's image: New Forest Farm in Wisconsin	14
Pasture Pigs	15
Agroforestry: Silvo-pastoral cattle systems in South America with feed at three levels ..	16
Maori Agroecology	17
Mangarara Farm, New Zealand	19
Tackling several sustainability challenges at once: Environment, resource efficiency & animal welfare	20
Tackling climate change in South Africa.....	21
Feeding pigs on by-products and food waste instead of cereals and soy.....	22
In summary	22
Acknowledgement & References	23



Regenerative agriculture

Regenerative agriculture aims to farm more in harmony with nature, taking care of precious resources and integrating plants and animals with the land in ways that help to restore nature's resources. Regenerative farming not only builds back soil health, pollinators and other biodiversity, as well as conserving water and storing carbon from the atmosphere whilst creating more livelihoods on the land, it also provides the environment for the very best animal health and welfare.

This is very different to industrial or intensive farming which instead has a damaging effect on soil health, biodiversity and water conservation whilst releasing carbon into the atmosphere and causing inherently poor animal health and welfare.

Some argue that we can make the industrial model more efficient, for example by more precise use of pesticides and fertilisers. However, industrial crop production is innately damaging to natural resources. Similarly, with its poor conversion of cereals and soy to meat and milk, industrial animal agriculture is inherently inefficient. Claiming these systems can be made more efficient or sustainable is a verbal sleight of hand; they can simply be made less inefficient and less damaging.

Instead, what is needed is a move to regenerative, nature-positive forms of farming. Regenerative farming works with nature, supporting - and harnessing - natural processes.

It does this through mixed farming of crops and animals that are rotated around the farm in ways that keep soil covered up using 'cover crops' and minimizing soil disturbance through ploughing. Farm animals are an integral part of this healthy, humane and nature-friendly system by being kept more naturally as grazing and foraging animals, either moving around permanent pastures or as part of the overall crop rotation.

It aims not just to minimise negative impacts but to be a positive force, for example by producing food while at the same time enhancing soil quality and restoring biodiversity. In this way, it goes beyond sustainability – being able to do tomorrow what we do today – enabling farming's ability to do *more* tomorrow.

The aim of this briefing is to provide an introductory view of how regenerative farming and other innovative approaches are practised in many different situations and countries across the world.



Regenerative agriculture - key characteristics

The key characteristics of regenerative farming include:

Minimising the use of external inputs: such as artificial fertilisers and chemical pesticides as these are often environmentally damaging and expensive, so undermining farmers' incomes.

Closed loop fertility: soil fertility is built not by chemical fertilisers, but through the use of composts, cover crops, legumes which can 'fix' atmospheric nitrogen into the soil, rotations and manure from animals raised on the farm. Regenerative farming also avoids disturbing the soil through ploughing as much as possible, thereby not disturbing the animals and plants that make up soil ecology and drive fertility.

Integrated pest management: This minimises the use of chemical pesticides, employing them only as a last resort. Instead, it uses natural processes to tackle pests and plant diseases.

Water conservation: much more water can be retained in the soil naturally by building abundant organic matter.

Feeding animals only on materials that cannot be eaten by people: Animals only make an efficient contribution to food security when they convert materials we cannot consume into food we can eat. Human-edible cereals and soy should not be used to feed animals as they convert them very inefficiently into meat and milk.

Restoring the link between animals and the land: Good grassland systems for raising cattle and sheep do not feed grain to the animals and minimise the use of chemical fertilisers. By restoring animals to the land, they can play their part in building soil fertility, biodiversity and water conservation. It also means that the animals themselves are kept in more natural environments that provide scope for the highest animal welfare.

Minimising the use of antimicrobials and other pharmaceuticals: Regenerative farming uses 'health-oriented systems' for the rearing of animals, systems in which good health is inherent in the farming method rather than being propped up by routine use of antimicrobials.

Diversity of crops and animals: monocultures of both crops and animals are vulnerable to pests and disease. Nature abhors a monoculture. Crop and animal diversity on rotational farms enhances resilience, soils, biodiversity and water conservation as well as controlling pests and disease more naturally.

Focus on quality, not just on quantity: Industrial agriculture largely focuses on quantity, while regenerative farming recognises the value of producing food of high nutritional quality. Studies show that mixed farms, whilst naturally producing less of a



single commodity, are nevertheless more productive overall. A mixed portfolio of products also provides greater resilience to farmed incomes as it spreads the risk.

Farmer livelihoods: In developing countries regenerative farming increases crop yields. This, together with only minimal use of expensive external inputs, improves the livelihoods of small-scale farmers.

Find local solutions to local problems rather than the one-size-fits-all technofix of industrial agriculture: Soil type and quality, rainfall, biodiversity and disease threats are highly variable and so tailoring the key precepts of regenerative farming to local agro-climatic conditions is essential. The leading principle for nature-positive farming is to work in harmony with nature in ways that are context-specific, i.e. right for local conditions.

Agro-forestry is a key element of regenerative farming and can produce important environmental benefits.

Snapshots of regenerative agriculture and other pioneering approaches

Sustainable Agriculture Tanzania

Sustainable Agriculture Tanzania (SAT) explains that unsustainable farming “is, simultaneously, a cause and an effect of poverty. People who urgently need money are likely to plant only a few promising crops and to apply synthetic fertiliser and hazardous pesticides, hoping to secure their yields. However, on the longer run this practice can lead to various harmful effects that worsen the farmers’ situation: loss of soil fertility, increased pest attacks, reduced water holding capacity, to name a few. All this causes a vicious circle where reduced profitability aggravates the farmers’ situation who in response, try harder to exploit the land with unsustainable methods”.ⁱ

SAT teaches farmers how to escape the poverty trap by the adoption of agroecological methods. SAT disseminates knowledge through farmer groups directly in their villages, through courses at its Farming Training Centre and through a monthly farming magazine. Since agroecology was introduced the farmers have achieved improved yields, better livelihoods and healthier, more balanced diets with diverse nutrition. SAT aims to create food self-sufficiency and food security all year round.

Soil health and fertility have been built by composts and crop residues and steep land has been terraced to prevent soil erosion. Water is retained in the soil through mulches; water use has been reduced by 59%.ⁱⁱ Farmers have been able to increase crop resilience to extreme weather conditions. Organic farming methods have led to more stable yields despite very unevenly spread rainfalls.



© Sustainable Agriculture Tanzania

Beneficial insects and intercropping with repellent plants are used to repel insect pests. The use of agro-chemicals has been reduced, in the case of pesticides, to almost zero. The farmers have revived and regenerated degraded land. They use inputs that are produced on the farm rather than relying on inputs brought in from far away; as a result 61% have reduced their input costs.ⁱⁱⁱ

SAT also teaches farmers business development skills including entrepreneurship and how to improve market access. This has led to 50% of farmers having better market access.

A core element of SAT's work is the empowerment of women and girls. This is crucial as 52% of the workers in Tanzania's agriculture are women. 60% of the farmers SAT worked with in 2019 were women. SAT explains that the *Dodoma's Women in Agriculture and Business Initiative* aims at the empowerment of women in agriculture as well as entrepreneurship. Diversification in production, suitable ecological farming methods, financial as well as entrepreneurial skills and full participation in decision-making open new perspectives to women in Dodoma's drylands.

One woman working as a farmer-to-farmer facilitator says: "Within one year, my family's life has become much more secure. I can care for our children's school fees and there is enough fresh and healthy food for everyone. My drought-resilient kitchen garden attracts people from the community. I'm happy to advise others on the technologies I learnt to use and to inspire them with my business model". Such kitchen gardens improve food security and provide diverse nutrition.



SAT has also launched a scheme called *FairCarbon4Us*. Farmers receive training as well as direct payments for planting and taking care of trees. The selected tree species improve the soil as well as biodiversity. Moreover, they increase and diversify the farmers' income. The trees planted include fruit trees and other species for feeding livestock. This scheme combines the social, economic and ecological potentials of carbon sequestration, agroforestry and organic agriculture.

Rotational grazing in the US: White Oak Pastures

Until the mid-90s this was a conventional cattle farm using pesticides, chemical fertilisers, hormones and antibiotics. Then the owner, Will Harris, decided to move to regenerative farming.

Today, Harris farms using a multi-species rotational grazing system. On 2,500 acres, he has a rotating mix of 2,000 cattle, 1,200 sheep, 750 goats, 1,000 pigs, 60,000 chickens for meat, 10,000 laying hens and a thousand turkeys. There are also 1,500 ducks, geese and guineafowl, fifteen guard dogs, nine horses and 'countless microbes in the soil'.



© White Oak Pastures

The herds and flocks follow a 'Serengeti rotational model', with large ruminants followed by small ruminants and then birds. Harris sees it as emulating the movements of wildebeest on the ecologically rich grasslands of Africa. The herds adhere to the 'law of the second bite'; animals are moved before they can take that 'second bite' of the same plant, allowing the land to rest and the vegetation to recover.

As well as pasture-fed and pasture-raised farmed animals, there is a 5-acre organic vegetable farm growing over 40 kinds of vegetables, fruits and nuts. By eliminating pesticides and fertilisers (instead using homemade compost), the soil matter is growing, which sequesters huge amounts of carbon every year. Their website states: "we rotate complimentary animal species side-by-side through our pastures. The cows graze the grass, the sheep and goats eat the weeds and shrubs and the chickens peck at the grubs and insects. All species naturally fertilize the land and our soil is again a living organic medium that teems with life".



China: high welfare pig production

Intensive pig production usually involves keeping the breeding sows in crates so narrow that they cannot even turn round. They are confined like this for most of their adult lives. During pregnancy they are kept in gestation crates (sow stalls). A few days before giving birth (farrowing) they are placed in equally restrictive farrowing crates where they farrow and are kept till the piglets are weaned at 3-4 weeks of age. The fattening pigs are usually tail-docked, teeth-clipped and kept in barren pens without any enrichment.

However, Heilongjiang Dongnong Sanhua Pig in Harbin, China bucks this trend. The company was awarded a 5 star Good Pig Production Award from Compassion in World Farming in 2015. The sows on its three farms are never confined in crates; neither sow stalls nor farrowing crates are used. They have more space (3.5m² per sow) than is usual in intensive farms and antibiotics are only used on very rare occasions. The pigs are not tail-docked or teeth-clipped. Straw is provided as bedding and enrichment.

Community Supported Agriculture, China

Community Supported Agriculture (CSA) has been adopted by a network of organisations working to encourage sustainable farming and rural social justice in China. It has drawn farmers of all skills, beginners and advanced, as well as urban consumers. It aims to provide real income to producers and affordable healthy food for consumers.

China's CSA aims at creating commercially focused agricultural businesses through establishing environmentally-friendly agricultural practices as well as dependable distribution networks to consumers. CSA fosters better relations between producers and consumers by encouraging small-scale farming which is organic and sustainable. The aim is to tackle the problems entailed in intensive agricultural practices.



© Self-Sustainability

Example: **Little Donkey Farm, Rural Beijing:** The farm rents farmland to residents of the city of Beijing; this enables them to cultivate the land and so have access to fresh, healthy, safe and quality food. The farm aims to develop sustainable agriculture. The farm is localised and provides technical training, without the use of chemical fertilisers, to ensure the food grown is organic. For those who do not wish to be involved in the farming themselves, food can be bought at the farm, or collected from one of the four delivery points in the city of Beijing, or delivered to the home of consumers.^{iv}

Water harvesting in Ethiopia: Improving the lives of people and farm animals

Ruminant livestock play a key role in Ethiopia's agriculture. Many farmers have a number of livestock, usually a few goats, a cow, a couple of oxen and donkeys and possibly some chickens. They provide not just meat but also draught power for ploughing, hides and manure which is vital for building soil fertility and is also sometimes used as fuel and to plaster houses.

However, in the dry season, there is no rain for around six months in some parts of Ethiopia. Farmers often had to sell their livestock as they could not afford to feed them during the dry season and needed the money from the sales to buy food for their families. A few years ago the Government helped farmers with part of the cost of water harvesters. A water harvester is a large, deep hole dug into the soil and lined with a geo-membrane to stop leakage. It stores rainwater collected during the rainy season for reuse in the dry



season. Its simple structure and basic material ensures it is accessible to small-scale farmers.

Livestock no longer have to be sold during the dry season as year-round availability of water has boosted crop yields up to ten-fold. This makes it possible to continue to feed the animals throughout the year. Year-round access to water has also improved food security, nutrition and farm animal welfare and reduced poverty in small-scale farming in Ethiopia. This shows that productivity can be greatly boosted without resorting to industrialisation.

Case study: <https://www.ciwf.org.uk/media/3819837/ethiopia-case-study.pdf>

Chickens producing both meat and eggs for small-scale farmers in Africa

Large scale chicken production for eggs or meat is out of the reach of small-scale farmers. Moreover, around 70 years ago the industry split into two with some chickens bred to lay huge numbers of eggs while others were selected for rapid body growth to produce large amounts of meat.

The birds raised for meat (broilers) have been genetically selected to grow very rapidly. What grows quickly is the muscle – the meat. But the supporting structure of legs, heart and circulatory system cannot keep pace with the rapidly growing body. As a result, each year globally hundreds of millions of broilers suffer from painful leg disorders, while others succumb to heart disease.^{v vi} The hens that lay eggs have been genetically selected to lay around 300 eggs a year. Such high egg yields cause osteoporosis and result in hens being very vulnerable to bone fractures.^{vii}

In contrast to this, a farmer in South Africa produces dual-purpose chickens that provide both eggs and meat. His crossbred chickens are able to adapt to the country's harsh climate and have become extremely popular because of their robust capacities. Bred for hardiness and disease-resistance, they are well suited for free-range and are able to forage for much of their feed. They have been exported to 17 African countries including Malawi, Angola, Zambia, Botswana, Swaziland and Namibia.

Boschveld chicken is a cross breed between three indigenous breeds: the Venda, the Matabele and the Ovambo. These fast-growing chickens are hugely successful in South Africa and now number over two million due to their resilient capabilities in the South African climate, surviving and producing on what nature provides for them. Only a small amount of maintenance food is provided to boost production. They are currently sold to farmers in packages of ten and with a small coop.



South Africa: Angus McIntosh

Some 30 miles from Cape Town is the Spier estate where farmer, Angus McIntosh, farms 126-hectares and has 3,000 laying hens and a mixed herd of cattle for beef. Hens follow the cattle, pecking insects out of cowpats as they go. They roost in moveable chicken coops like large igloo tents on runners to make shifting them easier.

“The overriding principle is that we are custodians of the land and we need to ensure that at all times fertility is improving on the farm,” McIntosh said.

His website states “Regenerative agriculture builds soil resulting in healthy plants. Animals feeding on these pastures provide humans with a healthy food source”.

His pastures include a variety of different perennial summer and winter legumes, herbs and grasses. He uses a form of ‘mob grazing’. This involves letting a large number of cattle graze a relatively small area and then moving them on twice or more a day to avoid overgrazing. The enormous amount of manure and urine that is deposited onto the soil eliminates the need to apply any artificial fertilisers. By limiting the duration that cattle graze on one piece of land, the animals focus on the most nutritious top parts of the grasses. The cattle do not return to the same pasture for at least six weeks to allow the grass to regenerate.

Angus McIntosh moves his cattle four times a day, the pigs every three days, the broiler chickens, in safe enclosures, are moved daily and the laying hens, accommodated in constructed Eggmobiles, are also moved daily.



© VoiceMap

Back in 2014, this was the first farm in the world to be paid carbon credits for increasing the carbon contents in the pastures where the cattle graze. An audit carried out in 2020 reports that since the mob grazing project began, the farm has sequestered the equivalent of 15,886 tonnes of carbon dioxide.



Turning away from the grain merchant can boost farmer incomes

Neil Heseltine farms in an upland area in Yorkshire in the UK. His cattle are out on the hills all year round and feed entirely on grass. They are fed no grain and never have been. His sheep, however, were fed a lot of grain. In 2012, Heseltine realised that his cattle fed only on grass were making money, but his grain-fed sheep were not. At best, they were breaking even. So, he took the bold step of cutting out the grain-feeding and – as grass alone can sustain fewer animals – halving the size of his flock.

At first sight this appears to be a recipe for financial disaster. However, fewer sheep meant the grass was no longer overgrazed and so provided better nutrition. The flock became healthier and so much less reliant on routine medication. In 2012, his 400 grain-fed ewes and their lambs made him just £478 for the year. Four years later, and with just 200 ewes and their lambs, Neil was making over £17,000 for the year. This staggering turnaround resulted from the cost of feed and veterinary drugs being minimised.

Arakunomics: a vision for India focusing on regenerative agriculture and healthy food

Arakunomics is one of the winners of the Rockefeller Foundation's Food Systems Vision Prize in 2020. The Naandi Foundation, which leads the Arakunomics vision, describes how in India "there is an increasing dependence on cheap ultra-processed foods and a lack of biodiversity in food production, resulting in poor nutrition. Farming has also become unprofitable, through a decline in soil fertility; increasing pest attacks; and the adverse impacts of the climate crisis".^{viii}

In recent decades mono-cropping, especially cash crops such as cotton and sugarcane, has replaced food crops. The majority of India's farmers are smallholder farmers, who are getting increasingly impoverished due to loss making, debt-based agriculture.

Soil profile analyses in different parts of India show depleting soil organic carbon, which also results in low water retention. The World Bank reports India as the world's largest user of groundwater, leading to rapid groundwater level depletion. Mono-cropping with drastic depletion in biodiversity is becoming the norm. Increasing use of chemical fertilisers, pesticides and herbicides are leading to serious environmental problems.

Arakunomics' vision for 2050 is: "A shift from frequent food crises to a system based on decentralized and regenerative farming, where farming is once again profitable and environmentally sound, and where healthy food is affordable and bountiful".^{ix} The vision highlights the importance of India's consumers becoming "conscious of the food they consume as well as the impact of that food's production on their health and the planet. We will promote education to foster well-informed consumers who have a deep interest in the 'journey' of their food".



The Naandi Foundation has been working in 19 states of India covering 10,000 villages and slums. Naandi has developed its vision in three diverse regions. They include:

- **Araku, a mountainous forest area** characterised by extreme poverty, denudation of forest, erosion of soil, high maternal mortality rates and increasingly eco-fragile terrain.
- The district of **Wardha** in central western India. This region has been infamous for one of the highest farmer suicide rates in India. The hot, arid conditions have made this region the epicentre of agrarian distress in India.

Naandi focuses on improving soil fertility by using composts and organic matter to bring life back to the soil below the ground. This increases plants' ability to derive nutrients from the soil without needing chemical fertilisers. It also helps create disease suppressant soils and enhances water retention which boosts climate resilience. Naandi states "Regenerative agriculture practices increase SOC [soil organic carbon] and with every 1% increase of SOC, 25,000 gallons of water can be stored in an acre of land". This supports plant growth and can replenish groundwater.

Araku: Here there has been a focus on horticulture, forest restoration, the planting of trees and agroforestry. Expansion of the production of millet, ginger, turmeric and fruits is planned. Naandi's vision includes not only reviving indigenous varieties of trees and plants, but also bringing back birds, bees and insects to sustain a healthy ecosystem.

Araku has also shown that with zero involvement of middlemen, farmers' produce can be supplied not only to domestic markets, but also niche global markets, especially for cash crops like coffee, thereby enabling high profit margins from even small parcels of land. Already in the districts where Naandi has been working, 40% of the farmers have been able to pull themselves out of poverty solely through agriculture.

Wardha: Naandi states: "Punishing weather, desertification of soil, market-led thrust on cash crops like cotton, and inability to access markets have created large populations of dejected farming communities in Wardha. A short term approach to food and agriculture has been accentuating poverty and creating an agrarian crisis situation. Like in Araku, Naandi's approach here has been to create agricultural clusters that focus on composting waste into soil, mechanisation of farm practices and skill upgradation of farm labourers. This and a market savvy mix of horticulture, cereals and vegetables has resulted in reversing the trend of indebtedness, loss and resultant farm suicides. The last few years of our work has shown an increase in soil carbon levels and greater resilience of crops to pests and extreme climate conditions."^x

Brown's Ranch, North Dakota

The Brown family focuses on farming and ranching in nature's image. Improving soil health is a priority and no-till farming has been practised since 1993. They employ mob grazing to enhance soil quality. The large number of cattle grazing in a small area



trample the dung and urine – as well as some of the grass they do not consume - into the ground so nourishing the myriad micro-organisms living in the soil.

The farm prioritises diversity, producing a huge variety of crops including spring wheat, oats, corn, sunflowers, peas, alfalfa and lentils. This diversity provides the food (carbon) that feeds soil life. Soil life, in turn, supplies the nutrients needed for the crops.

Early in the year cover crops including millet, sorghum, sunflowers, along with radishes and turnips, are planted. This mix helps increase the organic matter content of the soils (some two-thirds of increases of organic matter comes from roots). This cocktail is then grazed by the cattle anytime between October and January.

The Browns have eliminated the use of synthetic fertilisers, fungicides and pesticides. They only use minimal herbicides and are striving to end this. Ending the use of insecticides has led to a large increase in predator insects that control the pest insects.

As well as cattle, the Browns farm broilers, laying hens and pigs. They run the chickens behind the cattle because they do an excellent job of sanitising the land and provide nutritious eggs and meat. The hens lay in a portable eggmobile that is moved a few times a week and they are able to range freely. The broilers are contained within a broilermobile that is moved daily so they can forage and pick for insects. The pigs too are raised on pasture.

Redesigning agriculture in nature's image: New Forest Farm in Wisconsin

This is considered as one of the most progressive regenerative agricultural farms in the US through its use of agroforestry techniques and water management. Nut and fruit trees replace row crops; animals graze and forage grassy alleys between the trees.

The farm is a planned conversion from a worn-out intensive grain farm into a commercial-scale, perennial agricultural ecosystem. Overall, the land attempts to mimic the local oak savanna biome which is a lightly forested grassland where oak trees are dominant. The farm's innovations include managing the runoff, retention and control of water throughout the property and placing its focus on perennial rather than annual crops. Mark Shepard, who runs the farm, says: "These natural systems aggrade over time, which is the opposite of degrade".^{xi}

The farm is entirely solar- and wind-powered and farm equipment is driven by locally produced biofuels. Over the last 15 years, an estimated 250,000 trees have been planted on the 106-acre farm.

The main crops are chestnuts, hazelnuts and apples. The farm also produces walnuts, hickories, pine nuts and pears, together with cherry trees, elderberries, asparagus and



winter squash. Between the tree crops, the grassy alleys are often grazed by cows, pigs, turkeys, sheep or chickens.

The economic resilience of such farming is highlighted by Mark Shepard: “The seasonal pattern on a restoration agriculture farm will vary with its location, but in our neck of the woods yields begin in late winter with the sale of nursery stock. We then move into asparagus harvest, field prep for annuals, annual produce harvest with crops such as zucchini, peppers, eggplant throughout the summer, followed by winter squash in the fall. Beginning in late summer, hazelnuts and apples are harvested followed by chestnuts. Livestock sales happen periodically throughout the summer with the majority happening in late fall. Throughout the year apple cider is fermented into alcoholic apple cider. The system has some sort of cash-flow no matter what the season”.^{xii}

Pasture Pigs

Farmed pigs normally consume large quantities of cereals and soy and so at first sight seem to have no place in regenerative agriculture. However, some innovative farmers are raising pigs on pasture with most of the pigs’ feed coming from pasture, crops grown on the farm and food waste.

UK farmers Jonny and Rachael Rider raise pigs on grasses, clovers, herbs and wildflowers. They also farm dairy cows, sheep, hens and goats; the pigs often graze in the same field as the cows. 75% of the pigs’ feed is from pasture alone. During the grass-growing season the pigs get all their nutrition from grass. During the winter they are moved indoors sharing accommodation with the cows. Here they are fed on sprouted oats and lucerne grown on the farm, as well as waste milk from the dairy operation.

Buying in feed accounts for around two thirds of the costs of rearing intensive pigs. The feed costs of pasture raised pigs are many times lower than for pigs fed on costly cereals and soy. These savings compensate for the longer time needed to reach slaughter weight with pasture pigs, as well as the smaller litters and later weaning ages.



© Gothelney Farm & Fred Price

Another UK farmer, Fred Price, also raises pigs on pasture. 70% of their feed comes from pasture with the rest being a home-grown barley and beans mix. A third UK farmer, Simon Cutter, supplements the pigs' pasture feed with food that has gone beyond its sell-by date including artichokes, raspberries, bread, apples, potatoes and pumpkins.

Agroforestry: Silvo-pastoral cattle systems in South America with feed at three levels

Alongside pasture at ground level, these systems also provide shrubs (preferably leguminous) and trees with edible leaves and shoots.^{xiii} Such systems produce more biomass than conventional pasture and so result in increased meat and milk production per animal and per hectare. This approach and other forms of agro-forestry can reduce the competition between agriculture and forests.^{xiv}

Silvo-pastoral systems can produce important environmental benefits.^{xv} The deep roots of the trees and shrubs can enhance soil structure, so improving water retention and soil biodiversity while minimising soil erosion. The deep roots can also prevent nutrients from leaching into groundwater. Where the shrubs or trees are leguminous, there is no need to use synthetic fertilisers. Silvo-pastoral systems have much greater biodiversity than pasture-only systems. They are home to many more wild birds and mammals and beneficial insects such as dung beetles. The birds and larger insects are predators on ticks, so reducing tick-borne disease and the need to use chemical pesticides to control the ticks.



Cattle browsing Leucaena in a silvopastoral system,
Caribe, Colombia
©Walter Galindo, CIPAV

Maori Agroecology

Tui Shortland belongs to the Indigenous community of New Zealand. One of her projects is a 165-acre plot of land north of Auckland called Awatea. The land is used to grow food using the same traditional knowledge, methods and practices that their ancestors used. The aim is to connect people back to the land, as well as grow foods in an ecological way that promotes health and re-introduction of traditional livelihoods.

Since Awatea has been established they have increased indigenous biodiversity and bought back many varieties of Maori foods and now have an established collection of 50 native plant varieties. With every generation of foods grown out to seeds, they distribute this to other Indigenous leaders so they too can grow sustainable food.^{xvi xvii}



© Tui Shortland

At Awatea they offer services such as:

Indigenous Family Farming Consultancy: Offers a farm consultancy service and workshops with specialisms on bringing back pollinators, increasing biodiversity and innovations for climate resistance.

Indigenous Landscape Restoration: Consultancy service and workshops on landscape restoration to regain ecological integrity in deforested or degraded indigenous landscapes. Aims to improve water quality and develop healthier soils that promote healthier vegetation.

Organic workshops and seed saving: Workshops are for members of the public to learn how to farm using indigenous practices that promote ecological integrity.



Mangarara Farm, New Zealand

This is a low-input family run farm that uses a wide range of regenerative agricultural techniques such as mob grazing and permaculture of nut trees and fruit bushes to enhance the farm's ability to provide healthy crops and soils. The farm aims to build resilient soils that hold more moisture and cope longer with dry spells. Any water that leaves the property is clean as no chemicals are used.

Their website says: "It is the goal to have at least 7 layers of production in the system which includes Chestnut trees, hazelnut trees, pine nuts, apples, berries, and also raise cattle, pigs, chickens and turkeys". This increases the farm's economic resilience and viability.



© Mangarara Family Farm

The website adds: "It makes sense to me to be producing our food from tree crops that can get their roots deeper into the ground to source water and nutrients and they don't need all the fuel necessary to grow annual crops" ... we "plant trees in paddocks to create a savannah effect so animals and pasture will get shade reducing evapotranspiration and increasing photosynthesis over a hot summer. We have been planting nitrogen fixing trees through the paddocks to help with nutrient cycling and to slow down the drying winds. Trials have shown cattle growth rates are improved when they have access to shade"



Tackling several sustainability challenges at once: Environment, resource efficiency & animal welfare

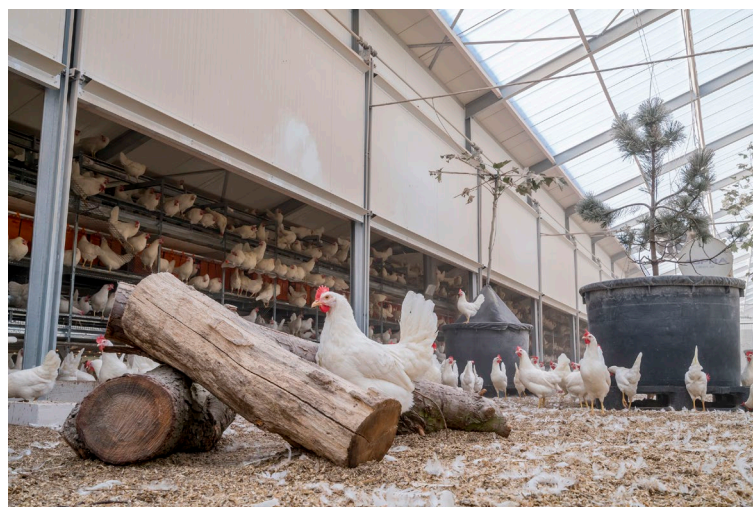
The egg farm of the future

The Dutch **Kipster** farm for egg-laying hens:

Is carbon neutral: it uses no fossil fuels – its energy needs are met by over 1000 solar panels in its roof.

Uses no human-edible feed – the hens are fed on by-products, such as sunflower meal and left-over bakery products.

Usually the male chicks in egg farms are slaughtered shortly after birth as it is assumed they cannot provide worthwhile meat. *Kipster* has overturned this assumption – the ***males are reared till the age of 15-17 weeks*** when they are slaughtered for various meat products including chicken burgers and nuggets.



© Kipster

Uses sustainable egg boxes – made from potato starch, cellulose fiber and water. The CO₂ footprint of the egg box is 90% smaller than a standard egg box.

Achieves first-rate animal welfare – the barn provides a natural wooded environment with plenty of variety, daylight and fresh air.



© Kipster

Tackling climate change in South Africa

In a study conducted in Northern Kwa-Zulu Natal and the Eastern Free State of South Africa with 59 farmers, the overall consensus was that their primary concern was climate change.^{xviii} As a result, 42 have taken up regenerative agriculture practices. Farms range from 500 to 25,000 acres. These farms have a combination of dairy, ranching and cropping operations with fruit, forestry and vegetable production often practised.

Across this region of South Africa climate patterns are changing. Rainfall is more intense and infrequent with dry spells occurring with increasing regularity. This has severe consequences for arable farms which need to maximise the capture and retention of rainfall in the soil. Key determinants of rainfall infiltration rates are land cover and soil health; healthy soils have a greater capacity to retain water. The first steps taken by the farmers were to rebuild the structure of soils that had been severely damaged by decades of heavy tillage; this involved slowing runoff and encouraging water infiltration of the soil by diversifying their vegetation through the use of multi-species cover crops.

Regenerative farming has helped farmers reduce production costs due to the declining need for synthetic fertilisers and reduced diesel costs arising from the move to minimum or zero tillage.



Feeding pigs on by-products and food waste instead of cereals and soy

Instead of feeding his pigs mainly on cereals and soy, an **innovative Dutch farmer** is using by-products and food waste from local businesses for much of his pig feed. He points out that “we need more and more land to feed the world population, which means we should use less wheat, barley, corn and soy for animal feed. We don’t want a feed-food competition. On our farm we use waste streams from local beer and mustard production, and the dairy and baking industries. With brewer’s yeast, dairy and wheat concentrate, we can replace a large part of our soy requirement”. He has even used *French fries that were fried too long, making them the wrong color to be sold in the supermarket, to feed his pigs*. He already fills 70% of his daily pig rations with local by-products and food waste.

In summary

As we hope this snapshot demonstrates, regenerative farming is based on growing renewable resources using methods that enhance animal welfare and eschew the need for inputs, like chemical fertilisers or pesticides, instead using natural cycles to grow food while replenishing soil, water quality and natural services like pollination.

Compassion in World Farming has been part of setting up a new body in the US, the Regenerative Organic Alliance, with the strapline ‘Farm like the world depends on it’.

By adopting regenerative organic practices around the world, we believe we can create long-term solutions to some of the biggest issues of our time; addressing the climate crisis, reversing the collapse of nature and reducing the risk of future pandemics, whilst providing for the highest animal health and welfare.



Acknowledgement & References

June 2021

Acknowledgement

Many thanks to Jack Palmer and Laura Shelley for their work in researching the farms and farmers featured in this briefing.

ⁱ Sustainable Agriculture Tanzania. 2019 Annual Report.

ⁱⁱ *Ibid*

ⁱⁱⁱ *Ibid*

^{iv} <https://strategiesforsustainability.viainteraxion.org/en/little-donkey-farm-%E5%B0%8F%E6%AF%9B%E9%A9%B4%E5%B8%82%E6%B0%91%E5%86%9C%E5%9B%AD-%E2%88%97-china/> Accessed 4 February 2021

^v Knowles et al, 2008. Leg disorders in broiler chickens: prevalence, risk factors and prevention. Plos one 3 (2): e1545. doi: 10.1371/journal.pone.0001545

^{vi} European Commission, 2016. Report to the European Parliament and the Council on the impact of genetic selection on the welfare of chickens kept for meat production. COM(2016) 182 final

^{vii} Farm Animal Welfare Council, 2010. Opinion on Osteoporosis and Bone Fractures in Laying Hens

^{viii} https://www.rockefellerfoundation.org/wp-content/uploads/2021/01/FSVP_Finalist-overview_Arakunomics_v3.pdf Accessed 4 February 2021

^{ix} *Ibid*

^x *Ibid*

^{xi} <https://ethicalfoods.com/interview-mark-shepard-new-forest-farm/> Accessed 26 October 2020

^{xii} *Ibid*

^{xiii} D. M. Broom, F. A. Galindo and E. Murgueitio, 2013. Sustainable, efficient livestock production with high biodiversity and good welfare for animals. *Proc. R. Soc. B* 2013 280, 20132025, published 25 September 2013

^{xiv} <http://www.fao.org/news/story/en/item/1103556/icode/> Accessed 21 November 2018

^{xv} Broom, D.M., Galindo, F.A. and Murgueitio, E., 2013. Sustainable, efficient livestock production with high biodiversity and good welfare for animals. *Proc. Roy.Soc. B.* 280, 2013.2025.

^{xvi} <https://www.awateaorganics.nz/pages/about-us> Accessed 15 January 2021

^{xvii} <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/protecting-worlds-biodiversity-tui-shortland> Accessed 15 January 2021

^{xviii} <https://www.resilience.org/stories/2019-09-17/regenerative-agriculture-is-trending-in-south-africa/>

Accessed 26 October 2020