

The principles of agro-ecology

Agro-ecology is the study of ecological processes that take place in agriculture and provides a whole-systems approach to the development of food production based on traditional knowledge and local experiences. The principles of agro-ecology offer the roadmap that allows farmers and nature to benefit from effective collaboration.

The sustainability of agriculture is vital for the health and wellbeing of human populations and in the discipline of agro-ecology there is an important role for farmers as the stewards of the environment and biodiversity. Farming methods that support functional biodiversity and organic methods of plant protection are 'systems that work'.

Agro-ecology should not be seen as a sweeping break from the past. It is important to realize that farming and food production were the foundations on which all civilizations were built....We quote from Jared Diamond's "Guns, germs and steel": ... "For most of the time since the ancestors of modern humans diverged from the ancestors of the living great apes around 7 million years ago all humans on Earth fed themselves exclusively by hunting wild animals and gathering wild plants. It was only some fifteen thousand years ago that the first people turned to domesticating wild animals and plants and eating the resulting livestock and crops....Among wild plant and animal species only a small minority are edible to humans or worth hunting or gathering....Most biomass (living biological matter) on land is in the form of wood and leaves, most of which we cannot digest. By selecting and growing those few species of plants and animals that we can eat....one acre of land can feed many more herders and farmers -typically 10 to 100 times more- than hunter-gatherers...."

Of the 250,000 species in the plant kingdom only a few thousand are eaten by humans and only a few hundred have been domesticated. Plant domestication is the process of causing a plant to change genetically from its wild ancestor into a product more useful to a human consumer. It took mankind several thousand years to develop the cereals and vegetables that we eat today and it was a long process of continuous trial and error by countless generations, in fact genetic evolution as a result of human selection, preferential planting and harvesting. Humans and nature were partners in this evolutionary process.

Now that we are in the age of genetic 'engineering' we start realizing that a huge amount of ancient knowledge is being lost but we also come to the conclusion that farming in ways that respect and copy nature makes much more sense than using copious amounts of mineral fertilizers and other agro-chemicals. These are practices that return a much greater profit to the producers of the chemicals than to the farmers. And because those chemicals depend on fossil energy, the practice is inherently unsustainable.

Agro-ecology offers abundant proof that, rather than using chemical pesticides it is a better strategy to enhance the diversity and abundance of natural enemies of crop pests. We now realize it makes more sense to work with nature and manage pests, diseases and weeds instead of “controlling” them.

The foremost agro-ecological guidelines are as follows:

- promote and conserve the genetic diversity of crops and animals
- integrate the protection of biodiversity as an element of food production
- improve the condition of the soil by raising the organic matter content and the biological activity
- reduce dependence on external, synthetic inputs and use local resources as much as possible
- recycle biomass – optimize and close nutrient cycles
- use biological nitrogen fixation
- integrate livestock
- minimize erosion by using perennials
- avoid dependence on single crops
- use intercropping and cover cropping
- use polycultures
- conserve water, use efficient irrigation systems
- use renewable sources of energy instead of non-renewable sources
- eliminate materials that have the potential to harm the environment or the health of farm workers or consumers
- respect local and traditional know how and practices

A healthy agricultural sector brings many benefits to society other than just food production. Agriculture creates regional economic vitality, stable households and communities.