

基本情况

姓名: _____

农牧基本数据: 土地面积(亩): _____
主要作物: _____
牲畜情况: _____
荒山面积: _____

在自己农田和荒山里有什么地方土生土长的动物、牲畜、农作物、树、灌木和草料: _____

干什么:

画一张自己家农田和荒山综合地图, 标出你家拥有的土地和荒山面积多少亩, 那里所拥有的水资源、牲畜、动物、农作物、林草资源的情况。 **Draw a map of your farm! Include the important resources that you and your family have including fields you have, their area in mu, the natural areas on your farm, water sources, your livestock, and other plants and animals.**

在今后的5-10年里, 你计划在你的农田和荒山引进什么农作物、牲畜、林草品种, 是不是计划对你的农田和荒地进行大的改变? **What crops, livestock or other important changes do you plan to introduce to your farm in the next 5-10 years?**

描述一下, 通过在自己农田和山地上的成功的经营, 你希望在一年后、五年后、十年后所能达到的环境、社会和经济目标。 **Describe the environmental, social and economic goals that you plan to accomplish within the next 12 months, five years and ten years in order to make your farm operations more successful.**

你认为, 在积极进行生态农业的过程中, 你应该承担什么样的责任, 这能给你带来什么发展机会?

What opportunities and responsibilities do you recognize on your farm as having the potential for making a positive environmental impact?

你希望在参与式的培训活动中有什么收获? What do you hope to gain from participating in this course?

培训目标: Course Objectives

培训目的为: The objectives of this course are to:

提供生态农业的基本概念, 介绍实用技术, 有助于土地、气候和水的长期合理利用。Provide a basic understanding of ecological farming systems and practices which enhance the long-term care of the land, air and water.

协助农民对现有的农业目标和措施进行评估, 按照生态农业的要求设计安排农业计划。Assist each participant to evaluate their farming practices and goals and to start designing a farm plan according to ecological principles.

培训内容: The topics covered include:

生态和可持续发展农业的基本原理介绍: Introduction- Principles of ecology and sustainable agriculture

土地肥力的管理: Soil Fertility Management,

-农家肥Manure management

-绿肥和Green manures and cover crops

农作方式: Cropping Systems

- 轮作Crop Rotations

- 混种Multiple Cropping

杂草控制Weed Management Control

病虫害控制Insect and Disease Control

牲畜犁地Livestock Husbandry

水土保持Soil and Water Conservation

Holistic Farm Planning and Design

在讨论建设我们自己的生态农业村之前，我们需要了解自然界的一些基本规律，知道我们本身的一些情况，分析为什么我们现在的发展情况是不能长久坚持的。
Before we can discuss about creating an eco-village or even our own individual ecological farm we need to understand the basic processes of natural systems, understand where we came from and why present day society is not sustainable.

环境是什么概念？What is the environment?

我们生存的环境是千百年来不断变化所形成的，世界上有热带雨林，高山险滩，有草原，也有沙漠和砒砂这种恶劣的自然条件。她为我们提供了我们生存所必须的水、食物和空气等等。Our environment is what surrounds us, a result of millions of years of evolution. There are many different types of environments tropical jungle, forested mountains, alpine plains, open grass lands, arid woodlands, sand or gibber deserts or coral reefs, but all rely on the same principals. The preservation of natural environments provides the opportunity for the many species that make it up, to live and evolve in a natural way and to maintain biological diversity and ecosystem processes. Our natural environments are a storehouse for food and medicine, and are a major source of clean air, water and soil.

什么是生态系统？What is an ecosystem?

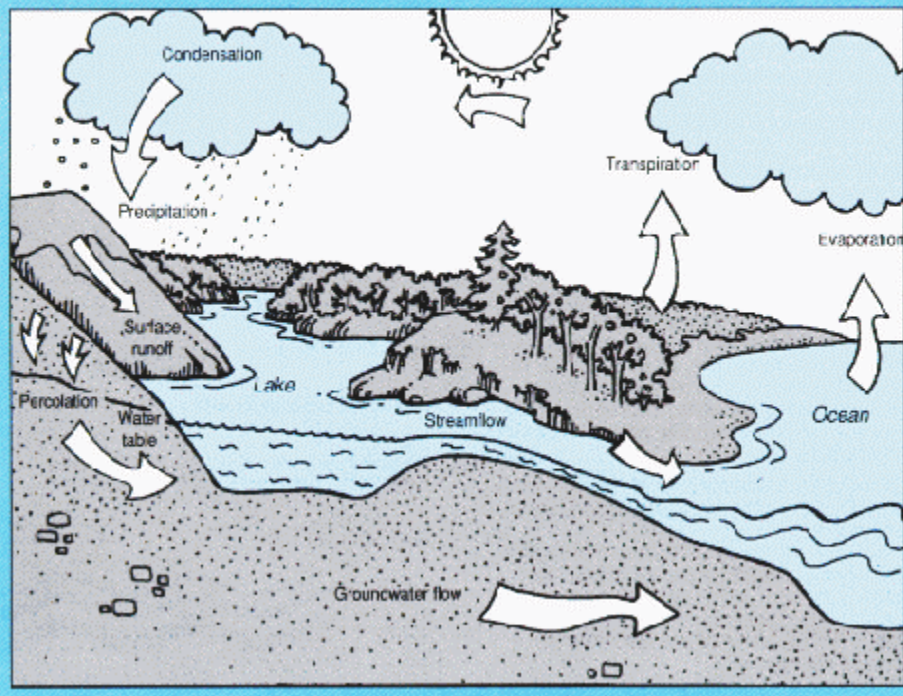
生态系统是自然界相互作用的一个复杂系统，里面有各种动物、植物，水、土地、太阳、气候，还有我们看不见的细菌等。这里面的每一部分都必不可少，任何一部分的变化，都会影响其他东西的存在。在生态系统里面，工作因素相互影响并且进行着循环，其中对系统影响最大的就是水、能量和养分的循环。An ecosystem is the complex system of interaction in the natural environment. That includes living things such as plants, bugs, animals and bacteria as well as non-living things like soil, water, rocks, climate, and the sun. All parts of the system are important! If one part of the system is removed, lots of other parts can be affected. Within an ecosystem, everything is connected with a relationship and nothing can be done without affecting something else. Many of these relationships form a circle or cycle. Some important cycles that affect most everything are **water**, **energy** and the cycling of **nutrients** and wastes.

水是如何循环的？How is water cycled?

万物生长离不开水，但是地球上93%的水都分配在大海里，或者是有毒，不能被人们直接利用。我们如何才能得到水，水从那里来，我们有必要了解水是如何循环的。Water is essential to life. However, almost 93% of the water on the earth is locked in the oceans, toxic to humans and many plants and animals. So how can we obtain fresh water? Where does drinkable water come from? To understand, we need to turn to the **Hydrologic Cycle**.

Figure 1

The hydrologic cycle



<http://www.und.nodak.edu/instruct/eng/fkarnar/pages/cycle.htm>

水的形态有固体、液体和汽体三种状态，主要有五个方面进行循环，水汽冷凝、降雨、渗透、汇流和蒸发。The hydrologic cycle is a way to show the movement of water around the earth in all of its three forms, solid, liquid, and gas. The entire process is very simple, divided into five parts: Condensation, Infiltration, Runoff, Evaporation and Precipitation

循环从水汽凝结开始，这就是天上的云，由于受到气温变化和云多少的影响，在合适的时候出现下雨、下雪和冰雹。水到地面时，部分水就渗透到地里，没有完全渗透的水就汇集在一起，形成水流，最终流入沟、河、湖、海。由于太阳的照射，所有有水的地方，都有蒸发，蒸发的大小受温度和风的影响。蒸发到空中形成云，完成了水的循环。The process begins with **condensation**, when water vapor in the atmosphere condenses to form clouds. This is affected by the amount of water in the air and a change in the temperature of the air or earth. As clouds form, winds move them across the sky, spreading out the water vapor. When eventually the clouds can't hold the moisture, they release it in the form of precipitation, which can be snow, rain, hail, etc. **Infiltration** is when precipitation seeps into the ground. This depends a lot on the permeability of the soil and the amount of water infiltrated is decreased when channels in the soil are not open to take water (for example due to tilling). If precipitation occurs faster than it can infiltrate into the ground, the water becomes **runoff**. Runoff remains on the surface and flows into streams, rivers, and eventually large bodies such as lakes or the ocean. Infiltrated groundwater moves similarly as it flows into rivers and heads towards large bodies of water. As both of these processes are happening, the power of the sun is driving this cycle by causing **evaporation**. Evaporation is the change of liquid water to a

vapor in the air. This process becomes faster with increased temperature, with a large amount of water exposed to the air or with lots of wind.

我们了解水的循环很重要，只有具备这些基本知识，我们就能明白现在为什么缺水，才能找到有效办法寻求更多的水。 We need the process of water cycling to sustain us and for all of our life processes to function. Without water, life would not be possible on Earth. When there is a lack of water, a better understanding of the way that water cycles is important because it allows people to understand why there is no water, and also to find ways to increase the water that is available to them.

能量和养分是如何循环的？ How are nutrients/energy cycled?

不管是人还是动物，还有植物都要吸收能量才能存活，吸收能量有太阳、食物等多种方式。 One of the major parts of life in an ecosystem is collecting energy. All living things in an ecosystem need energy to survive whether it be from the sun, or from consuming plants or other animals.

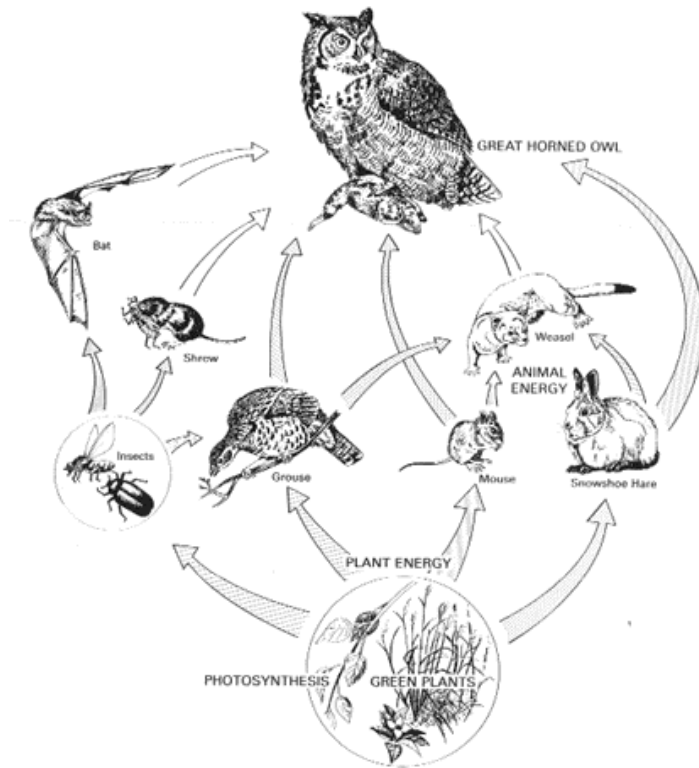
- 植物吸收阳光生长，并成为动物的食物Plants collect energy from the sun and then provide food to most living things.
- 植物腐烂后肥地，增加了地力The plant dies and feeds the soil organisms that decompose the organic matter into humus, which builds the soil.
- 小昆虫吃植物，粪便能肥地Insect's feed on the plants and decomposing matter in the soil.
- 小动物和鸟吃昆虫和植物Small animals and birds feed on the insects and plants.
- 人和食肉动物吃小动物和鸟Larger animals (including humans) eat the smaller animals and birds.
- 细菌分化动植物肥地，有助于植物的生长Small (microscopic) organisms break down the bodies of dead animals and plants and use them to build the soil, which can then grow new plants, closing the circle or cycle.

自然界的各种关系相互影响，能进行自然的能量循环，但是现在人类的大量不合理行为，乱砍、乱伐、过度放牧、过度用化肥，工业污染等，已经严重的影响了能量的正常循环。 The main source of energy for life on Earth comes from the sun. The sun provides energy for plants through the process of photosynthesis. Animals, including humans, cannot make their own food. As a result they must get their energy from other sources, usually plants and other animals. The cycle of organisms eating and being eaten is one way that parts of the environment interact with each other. Today humans are having such an impact on natural ecosystems that we are affecting their ability to function and cycle properly.

能量循环 Energy –食物链（大鱼吃小鱼，小鱼吃虾米、虾米吃草和水） The Food Web

图中所示的食物链表示出了自然界中的能量循环。每个食物链的能量循环均有所差别，这表明食物从一个生物循环到另一个，为上一级生物提供能量。 A food chain is a picture or model that shows the flow of energy in an environment. The energy that it

shows can be different for each food chain. This means that a food chain moves food from one organism to another, giving energy to the organism digesting the food.



www.eagle.ca/~matink/themes/Biomes/foodweb.html

练习：ACTIVITY:

根据你周围的实际情况建立动物的循环图 Create a food web for the animals/plants that surround you!

你能想象画出100年前的情况吗？有什么变化？ Can you create a food web from 100 years ago? How is it different?

什么叫生物多样性？为什么重要？ What is biodiversity and why is it important?

生物多样性就是在生态系统里有多种动、植物共同生存，包括小昆虫、细菌、鸟以及兔以及其它动物和植物。系统里面的种类越多，系统就越安全，因为大系统不会因为个别物种的变化出现混乱、崩溃。我们可以设想，一个只有猫头鹰、老鼠和粮

田的系统，任何一个环节的变化都会影响整个系统，甚至崩溃。这种影响也会直接影响到我们人类的生存环境。Biodiversity means having many different types of life existing together in an ecosystem, this includes insects, bacteria, soil organisms, birds, rodents, large mammals like deer. The more types of animals and other things living in an environment together, the bigger the food web and the more relationships there are between them. The more relationships there are, the stronger the whole system is. Why? Because if some things disappear from the web, the whole system will not collapse. Let us imagine that in the food web above the only relationships are between the owl, mouse and grain plant. In this case the system is very vulnerable. If the grain plants don't grow one year, it is likely that the mice will go hungry. If the mice are hungry, then some of them die and there is less food for the owl so they will also go hungry. If, however, the mice have many things to eat, they will not be hungry and the owl also will not be affected. The more types of food in the web, the healthier the animals are. The less links there are in a food web, the more susceptible those organisms are to food scarcity, disease, drought, and other difficult natural conditions. This includes humans! We can now see that our health depends on the health of the other organisms around us!

能不能描述一下你周围的生存环境？ Can you describe the environment where you live?

黄土高原原本的乡土树种是高大的阔叶林。黄土高原以前土地肥沃，并能有效保水，因此尽管有时天旱，仍然能保证收成。几百年前，大部分地方的林地都被变成了农田和牧场，特别是在1960年左右，森林的破坏更为严重。土地的逐渐变化，造成了水土流失，目前该地区45%的地方发生了严重的水土流失。近几十年，为了减少水土流失进行了植树造林活动，但是现在的弥补已不能恢复原有植被，并且种上的也不是本地的乡土树种。Native vegetation on the central China loess plateau consists of mixed deciduous broadleaf forests. The loess soils are well-suited to agriculture because they are high in nitrogen, potassium and phosphorus, and they retain water effectively. It is for these reasons that they are productive despite the region's seasonally dry climate. The natural forests in most areas were largely replaced centuries ago by agricultural cropland and pasture. The mid-twentieth century was a time of especially severe deforestation. This gradual conversion to agriculture has contributed to recent erosion, so much so that today erosion has affected 45 percent of the area, with an average annual soil loss of 3,720 tons per km². During recent decades, trees and other kinds of vegetation have been planted in an effort to reduce the amount of erosion, but these have not restored the natural forest and contain only a few tree species, many of which were not originally components of the forest in this region.

黄土高原北部的原生植被包括多种阔叶树种，OAK，BIRCH，MAPLE AND LINDEN，南部是ELM和ASH。Original vegetation in the northern part of the loess plateau consisted of mixed, deciduous broadleaf forests dominated by oak, birch, maple,

and linden with some aspen, willow, spruce, mountain ash at the higher elevations. Elm and ash are the dominant tree species at the lower elevations. Today, secondary growth, a result of disturbances such as logging, cultivation, and grazing, is more widespread than the original forests described above. Disturbed areas support shrub vegetation such as hazel, *Vitex negundo*, *Ostryopsis davidiana*, and *Spiraea pubescens*. Where grazing is intense, thorny shrubs predominate. These include *Zizyphus sativa* and *Caragana* spp. They are well-adapted to the seasonally dry conditions that occur here.

In spite of the regions almost complete transformation, small population of local wildlife still exist including rhesus macaque, musk deer, giant salamander, brown-eared pheasant, China larch and Koklass pheasant still persist. Three other protected bird species have been seen: black stork, Mandarin duck and golden eagle.

农业生产对环境造成了什么危害？ What have been the detrimental impacts of agriculture in China on the environment?

农业对环境的主要影响表现在，将大量的森林和草原改成了农田。公元1000年（宋前后），由于人口的大量增加，土地紧张，人们感觉传统的良田不够用，于是开垦坡地和山地。在当时农业生产高于一切，但是坡地和山地的产出又很有限，没有能力顾及水土保持措施。因此，不科学的耕作模式和过度放牧，是中国土地的沙化和河道淤积为世界之最。沙尘暴越来越厉害，洪水也频频发生。由于不能有效的保水，河流的季节性也更加明显。由于耕地面积的扩大和提高产量的需要，生物多样性受到极大的破坏，流域内生态系统和气候也随之改变。The main effects of agriculture on the environment of China have been the wide scale conversion of forested and grassland areas into farmlands. As early as 1000 AD, population density pushed Chinese farm families from the prime valley bottoms toward marginal lands in marshy, hilly and mountainous areas. Under the prevailing farming systems, however, the returns on these lands were often too low to induce farmers to invest in conservation measures. As a result, inappropriate cultivation techniques and overgrazing severely degraded large areas has led to the soil degradation and siltation of rivers in China being the worst in the world. Dust storms are now increasing in intensity. Flooding events are more intense with nothing to hold back the rains. Flow of rivers is now much more seasonal as the release of water from the landscape is no longer gradual. The biodiversity of China's plants, animals and birds has been devastated through the combination of expansion of lands in marginal areas and intensification of production systems. Major problems with watersheds are resulting as a result of changes to local ecosystems and changing climatic conditions.

农业生产排放出自然生态系统难以消耗的过量二氧化碳和沼气，对地球温度升高起了主要作用，其中包括为生产化肥、拖拉机燃料等化工产品来种植和运送食品，消耗了大量的原油。Agriculture is playing a major role in the warming of the planet through the addition of gases (such as CO₂ and methane) to the atmosphere which natural ecosystems do not have the capacity to recycle. This includes enormous amounts of fossil fuels consumed to produce the petrochemicals to grow (fertilizers, tractor fuel

etc) and transport food. As well there is a large impact of the clearing of land for agriculture, methane from the growing animal livestock industry, and the continued practice of burning of crop residues and grasslands.

人类和环境的关系应该是怎样的？What is the relationship between humans and the environment?

回顾以前中国原始农业社会 -最早的生态村是如何完全依靠自然生态系统的 To examine this we can look at how the original agricultural communities in China “The first Ecovillages” were fully dependent on natural systems

6000年前，原始社会完全依靠生态方式生存，生态系统提供了基本需求： 6000 years ago, communities were completely dependent on their ecosystems for their survival. The ecosystems provided them with their basic needs :

- 新鲜空气fresh air
- 干净水clean water
- 建造棚屋和工具的木材trees to frame houses and build tools
- 取暖、作饭和烧制陶器的能量energy for heating houses, cooking and to make pottery
- 作为主要食物的植物plants as the main food source (also for clothing, fishing nets and housing and medicine)
- 包括鱼、鸟和其他动物等食物many types of food including fish, shellfish, birds and animals (also for clothing and bones for tools)
- 进行农业种植的肥沃土壤以及制作陶器的黏土healthy soil to grow crops and make houses, clay utensils and pottery

以及其他重要的服务和 other important services including:

- 减轻洪水和干旱的危害mitigation of floods and droughts
- 废物分解detoxification and decomposition of wastes
- 土壤和土壤肥力更新renewal of soil and soil fertility
- 农作物和植物的自然授粉pollination of crops and natural vegetation
- 有效控制大部分的农业害虫control of the vast majority of potential agricultural pests
- 传播种子和运送养分dispersal of seeds and translocation of nutrients
- 保持生物多样性maintenance of biodiversity
- 稳定气候，调节极端气温和大风 stabilization of climate and moderation of temperature extremes and strong winds
- aesthetic beauty and intellectual stimulation that lift the human spirit

为什么古代文明出现生活水平降低？ Why did life deteriorate for some ancient civilizations?

人口不断增加，社会群体逐步扩大。在原有的地方拥挤后，人们开始向其他地方迁徙，最终分布在世界的各个角落。人们不得不扩大耕地面积来满足人口增长的需要。从世界范围来看，这种发展状况使得很多人饿死，一些文明因此消失，这些文明在发展超过本身的承载能力（承载能力为一个特定环境内其所拥有的资源所能承受最大限度的人口）。在很多古代文明中，当树被砍伐时，社会既失去了能量，流域本身也遭到破坏。同时，过度的农牧导致土地退化。随着人口持续增长对资源的需求，环境超过了其应有的承受能力，人们不能得到足够的食物和能量。最终，这种脆弱的资源供应导致了社会和生态的崩溃。Population increased and communities continued to grow. People would then migrate to other less favorable environments (of course people always take the best places first). Eventually most all the world became occupied and humans had to intensify agriculture to continue to meet the rising demands of the population. Around the world, this has led to the starvation of many people through the years, some civilizations were destroyed. These civilizations completely grew beyond their **Carrying Capacity** (the maximum number of people that can be supported by the natural resources in a given environment). In many ancient civilizations, as the trees were stripped, civilizations lost both their energy supply and watersheds. At the same time, soils were degraded by overgrazing and through intensification of crop production. As the population continued to grow along with its resource needs, the environment was stretched beyond its carrying capacity. The people no longer had the land base to grow the necessary food and didn't have adequate energy systems (horses and oxen ate grass and grains) to transport their food and other needs from distant lands. Eventually the dwindling resource supply leads to continuing social and ecological breakdown.

如何合理影响生态？ How can I have an effect?

现在我们应该及时改变不合理的行为方式，不能超过资源的承载能力。我们应该根据自然实际情况，规范我们的行动，创建一个良性循环并且不影响子孙后代生存的生态系统。The need now is to change the way we do things so that the carrying capacity of our resources is not exceeded. We need to model our activities after nature to create an economy that is cyclical and does not interfere with the capacity of future generation to meet their needs.

想象你能建立一个土地、农作物和牲畜协调发展的自然体系，既有更高的生产量，还有个环节的良性循环。

Just imagine if you could create a “living” farm where the farm is organized so that the soils, crops and livestock work together using natural processes making the farm more productive and its various components mutually supportive.

什么是生态农业？ What is ecological farming?

由于我们依靠自然获得食物、水和衣物生存，因此充分理解自然的作用机理十分必要：自然是一个不可分割的整体，如果我们在利用自然时从整体来考虑，有助于加深我们对自然的认识。建立生态农业是经营农田的最佳方式，能提高和优化土壤、植物、动物和人类之间的有机联系，增加产出效果。在生态农业原则的指导下，以设计的产出系统代替盲目追求产量，并从根本上解决传统模式中存在的问题。

Since we all depend directly on the landscape for our existence (eg: food, clothing, water etc.) we benefit greatly from gaining a complete understanding of how the landscape functions. Nature functions only as a whole, not in parts, and we will understand nature better when we manage it as a whole rather than as separate parts. Ecological Farming is a holistic approach for managing your farm that will optimize the health and productivity of the interdependent soil life, plants, animals and people. It emphasizes designing productive systems guided by ecological principles instead of trying only to increase production and deal with the effects of the problems instead of the causes (ie see pests spray pesticides).

为更好的理解自然界作用情况，我们按以前的设想进行分析，即自然界存在四个基本的过程。第一，降雨通过土壤过滤，被植物吸收或继续渗透形成地下水。当水能有效循环时，很少发生洪水，即使发生影响也较小，水通过地下水系流入小溪或泉水，不会产生水土流失。如果地面缺少植被，就会引起水土流失，降低土地的保水量，可能经常发生洪水。很明显，自然界有效的 水循环对生态农业是最基本的要求。To better understand how nature functions, we must consider the basic ecological processes that we discussed earlier. Looking closely, four basic processes can be found in all natural systems. First, water falls to earth as rain, filters through the soil and is either taken up by plants or continues downward and becomes groundwater. When water is cycling effectively, floods are infrequent and of lower impact, water is released slowly through underground flow into streams and springs, and erosion is virtually non-existent. If, on the other hand soil is bare this results in soil erosion, much less water entry into the soil and severe and more frequent flooding. So, an effective water cycle is apparent in nature and essential to ecological farming.

第二个基本过程是矿物质的循环，其基本路线是土壤到植物再到动物，再回到土壤中。在矿物的自然循环中，基本不发生损失。其实自然界本身不需要添加化肥，因为矿物可进行有效循环！为了可持续发展，我们应该减少对化肥的投入，积极想办法充分利用矿物的自我循环体系。如果我们不遵循矿物的自然循环规律，将不利于农业的可持续发展。A second natural process we can observe in nature is the mineral cycle through the biological system. Minerals needed for biological growth are constantly recycled from the soil to plant to animal and back to the soil again. There is very little waste in the natural mineral cycle. **There is no need for fertilizer in nature**, as all the fertility is recycled again and again with very little loss. Ultimately, to be sustainable, we need to find ways to utilize the natural mineral cycle while reducing our off-farm purchase of minerals. Farming practices that inhibit the natural mineral cycle, only reduce the long-term sustainability of our farm.

第三个方面是动植物群落倾向生物多样性，这样能最大限度的降低虫害。在自然界决不存在单一的物种世界。在单一种植某个品种的农作物地里出现杂草，就是生物多样性的自然选择。当生物多样性提高了，对农药和化肥的需求也就减少了。轮作就是提高农田生物多样性的基础。在轮作的基础上进行套种，让农作物和树木和谐共处，生物多样性又上了个台阶。如利用防护林以及其他特殊的植物，为害虫天敌营造良好的生存环境，能进一步丰富生物多样性并能提高生态系统的稳定性。 A third natural process shows us that plant and animal communities strive toward high biodiversity, which assures minimal pest problems. Large expanses of monoculture represent a simple level of diversity. Monocultures are almost never present in nature. Weed invasion is nature's way of injecting diversity into monocultural cropland. When biodiversity is increased, the cost of pest control and fertilizer is decreased. **Crop rotation** is the first step toward increasing biodiversity on the farm. It helps break weed and pest life cycles and provides complementary fertilization to crops in sequence with each other. Advancing from rotation to multiple cropping systems where trees and different crops can coexist in a mutually supportive way in the same field represents an even higher level of biodiversity. Increasing habitat for more beneficial organisms with more borders, windbreaks and special plantings for natural enemies of pests represent even higher levels of biodiversity and stability.

第四方面是太阳能在生态系统中的循环。太阳能通过被植物的吸收，给植物生长能量，并通过植物根系，将能量传输到土壤中。植物根系死亡后和其他枯枝败叶一并被微生物分解，增加了土壤的有机质。在地里种上不同品种的农作物，增加植物叶面受光面积，从而有利于太阳能的吸收。如果土地直接裸露一段时间，土壤中的微生物由于缺乏食物而受到影响。The fourth natural process involves the flow of energy from the sun through the biological system. Sunlight is absorbed by the green plant, enabling it to grow. Energy is transferred below ground through plant roots that eventually die. The dead roots become food for decomposer organisms. Finally the residue is broken down into nutrients and soil. Growing mixtures of two or more plant types increases the leaf area available to capture sunlight. The volume of plants also enhances energy flow. By growing two or more crops per year we can lengthen the time that plants are in the field collecting energy from the sun. If soils are left bare, no sunlight is being converted into energy. When energy flows are reduced by periods where the soil is bare or without a crop, the decomposer organisms living in the soil are on a starvation diet.

当我们影响四个方面的任何一个时，会对其他三个方面的循环带来影响，因为生态系统的循环是个整体。只有遵照生态的规律进行农牧活动，才能保证长期稳定的可持续发展。When we modify any one of these natural processes (water cycle, mineral cycle, biodiversity and energy flow) we affect the others as well-after all, they function as a whole. When we build or farm enterprises around these natural processes, we have a plan that will sustain our family today and future generations tomorrow.
<http://www.attra.org/attra-pub/PDF/holistic.pdf>

生态农业的基本要求： Principles of Ecological Farming

以自然生态系统为样板，理解可持续发展农业的概念 Use natural ecosystems as models for understanding sustainable agriculture

- 维护农作区域及周围地区的生物多样性 Maintain biodiversity within the farming system and its surrounding environment.
- 保护和开发适合地方条件的作物品种 Conserve and develop seeds and plant and adapted to the local environment.
- 为野生动物创造 良好的生存空间，提倡生物病虫害防治和自然授粉 Create wildlife habitat to encourage biological pest control and pollination of crops.
- 通过不断的向土壤施有机肥，增加土壤的有机质，提高土壤活性，来保持土壤长期肥效 Maintain and enhance long-term soil fertility by keeping the soil protected as much as possible while continually providing inputs of organic materials to encourage soil organic matter accumulation and soil biological activity.
- 在农作地区及周边区域，尽可能回收利用各种资源，为养分的良性循环创造条件 Recycle materials and resources to the greatest extent possible within the farm and its surrounding community as a strategy to create sustainable local nutrient and carbon cycles
- 通过水土保持、固氮、微量元素循环、提高土壤有机质、引进新品种等综合农业措施，提高产量 Increase productivity by strengthening the various components of the agro-ecological farming system (eg water conservation, nitrogen fixation, mineral cycling, soil organic matter formation, testing of more adapted plant materials)
- 给牲畜提供精细饲养 Provide attentive care to the health and behavioural requirements of livestock.
- 开发和符合社会和环境要求的新技术 Develop and adopt new technologies with consideration for their long range social and ecological impact.

逐步发展生态农业 Making the Transition to Ecological Farming

- 学习培训是一个循序渐进的过程，需要长期的积累。要善于总结自己的农作经验，加强与其他社员的交流，参加各种相关培训。 Education is an on-going, never ending process and it is important to realize it is not possible to be an expert after one training session. Be a good observer on your farm, talk with other farmers and visit their farms, attend workshops and conferences. Participate in training courses. Find information. Join an organization of farmers to learn more about ecological farming.
- 运用所了解的生态农业的知识，制定合理的农作计划。细心观察大自然，里面就有好多值得学习的。 Understand ecological principles and use them for the basis of a making a farm plan. Nature knows best. Observe, ask and learn from nature.

- 合理安排轮作，保证土壤合理休养，例如在种植养分消耗大的农作物前，先栽植能肥地的。Design a crop rotation that enables the soil to regenerate itself, for example use soil improving crops to replenish the soil following heavy demanding crops.
- 检测土壤的养分情况，及时调整养分平衡，优化作物生长环境 Test the soil and adjust nutrient levels to create a more balanced soil to optimize plant growth conditions.
- 根据劳动力情况，选折力所能及的实施范围。生态农业往往需要更多的劳力投入。Start on a small scale that you can manage well. Some ecological practices can be more labour intensive rather than capital intensive.
- 总结实施结果，为大范围推广进行适当调整 Monitor your results! Make appropriate adjustments before you expand the system.
- 进行多品种种植，提高农作物对天气、病虫害的适应性，也会提高劳力和农机具的使用效率。Diversify your crops to ensure you are not vulnerable to poor weather conditions, insect or disease outbreaks. It will also help you use your farm labour and equipment more efficiently.
- 选择合适的畜牧品种，并控制适当的数量，以免超过所能承担的供给能力 Select appropriate livestock for your farms conditions and keep adequate but not excessive numbers for the carrying capacity of your farm (eg. don't keep too many sheep if you don't have the hay and pasture)
- 在维护生态农业体系的同时，掌握如何让其为我们服务，带来经济效益 Know how to nourish your family well from your land, then focus on earning income from crops while continually building up your ecological capital...always ensure you have a healthy soil
- 生态农业的确能改善我们每个人的生活。我们每个人应该克服个人利益的狭隘意识，与社会和环境和睦相处，寻求个人利益和社会效益、生态效益的共同发展。Celebrate each day! Ecological farming can contribute to an improvement in the quality of life for everyone. Go beyond the narrow self-interests of personal concerns (i.e. greed and selfishness) and learn to create new and dynamic relationships with other people and the Earth as new pathways for personal growth.