# Duck-Rice-Fish Case Study Handout

## Ducking the Use of Pesticides, Fertilizers in Rice Paddies

Takao Furuno, a Japanese farmer, developed a system for growing rice that mimics natural systems. He puts ducks in his paddies (flooded parcels of land used to grow rice) to eat weeds and insects. The ducks' waste puts nutrients into the water that the crops can use. This means the farmers who have mimicked Furuno's system can save money because they do not need the pesticides or fertilizers typically used to grow rice. They also earn extra money by selling duck meat and duck eggs. Furuno's system also uses fish in the paddies, which become another source of income. Industrial rice farmers had discontinued this practice because the insecticides they used in their growing system would kill their fish. The Furuno system yields 20 percent more rice than conventional systems, which grow rice exclusively.[1]

**Efficiency:**

**Self-sufficiency:**

**Diversity:**

**Resilience:**

# Agroecology Case Studies Handout

### 1. It is all about the trees and the bees in Canada

Bees are vital to agriculture and natural biodiversity. Seventy-six percent of the world's most widely used food crops require pollination to be productive. A new Canadian initiative is looking to put bees to work to help conserve a fragile area. Trees are needed to protect watersheds—delicate areas of land that form the drainage systems for streams and rivers in which many plant and animal species thrive. Trees and shrubs help filter pollutants from stormwater runoff and anchor the soil with their roots, which reduces erosion. With a government grant, a British Columbia farm family will use their small woodland plot to blend apiculture (keeping bees for honey and pollination) with integrated agroforestry (agriculture that incorporates the cultivation and conservation of trees). In this system, the bees will pollinate the shrubs, while the trees and shrubs will provide natural windbreak protection for the bees.[2]

### 2. "Do nothing but microorganisms" farming in Thailand

According to a report by Horizon Solutions, in Thailand more than 20,000 farmers have adopted an integrated farming system known as "do nothing farming." They cultivate crops with minimal interference with nature, namely without plowing, weeding, pruning, or using chemical pesticides or synthetic fertilizers. They do, however, use effective microorganisms (EMs) that were developed by Dr. Teruo Higa from the agricultural department at the University of Ryukyu, Japan. EMs are a blend of microorganisms that readily exist in nature and have not been modified in any way, merely added to the fields. By enriching the soil and stimulating plant growth, EMs increase crop yields while allowing the farmer to maintain a balanced ecosystem.[2]

### 3. Grass farming in the United States

Joel Salatin calls himself a grass farmer. His Polyface Farms in Swoope, Va., was made famous by appearances in Michael Pollan's book *An Omnivore's Dilemma* and the documentary films *Food, Inc.* and *Fresh.* The hilly homestead is set on 100 acres of grass, surrounded by 400 acres of woodland. It is a polyculture—an agricultural system that tries to imitate the diversity of a natural ecosystem by using multiple crop and animal species in the same space. It includes chickens, cows, turkeys, rabbits, and pigs.

Salatin carefully orchestrates all the elements in an intricate symbiosis — every being follows its natural instincts to contribute an ecosystem service (benefit) that maintains the overall health of the pasture. For example, his large herd of cows feeds on a different quarter-acre of grass every day and contributes manure. Three days later, 300 laying hens—Polyface Farms' "sanitation crew" — are let loose to eat the fly larvae that have grown in the cow manure. The larvae are an important source of protein for the chickens, who fertilize the paddock with their nitrogen-rich excrement. Each year, the farm's closed-loop natural system produces 40,000 pounds of beef, 30,000 pounds of pork, 10,000 broilers, 1,200 turkeys, 1,000 rabbits, and 35,000 dozen eggs on just 100 acres. And, as Pollan writes, "at the end of the year, there is more biodiversity not less, more fertility not less, and more soil not less."[2]

### 4. What's good for the goose is good for the farm

Mother Goose Farms is a five-acre coffee orchard in Hawaii. Hawaii's mild climate is well suited to coffee trees. Because the land is sloping, tilling it would quickly erode the soil. Growing perennial trees avoids this problem. The trees also provide habitat for wildlife. The farm is certified organic, so instead of using herbicides, the farmers raise geese that waddle through the orchard eating weeds and fertilizing soil with their droppings. The farmers process their own coffee and sell it directly to local customers, bypassing intermediaries and allowing them to capture more of the revenue. However, what is sustainable in Hawaii might not be sustainable in Iowa. The sustainability of a farm is rooted in its own unique ecosystem, culture, and economy.[3]

1. Hossain ST, Sugimoto H, Ahmed GJU, Islam MR. (2005): Effect of integrated rice-duck farming on rice yield, farm productivity, and rice-provisioning ability of farmers. *Asian Journal of Agriculture and Development* 2(1&2): 79-86.
2. Adapted, with permission, from: Fenton I. *Five Holistic Alternative Farming Methods: Agroecology at its Best.* Worldwatch Institute. 2012. http://inesad.edu.bo/developmentroast/2012/08/inesad-news-ducks-in-rice-paddies-bees-in-bushes-and-chicken-sanitation-crews/?upm_export=print
3. USDA NRCS, Watershed Science Institute. *Sustainable Agriculture.* 1997. http://extension.umd.edu/sites/default/files/_docs/Sustainable_Agriculture2.pdf

# Gallery Walk Handout

As you review your classmates' posters, record how each case study embodies the agroecological qualities of efficiency, self-sufficiency, diversity, and resilience. Do the same for your poster, too.

## Case Study #1:

**Efficiency:**

**Self-sufficiency:**

**Diversity:**

**Resilience:**

## Case Study #2:

**Efficiency:**

**Self-sufficiency:**

**Diversity:**

**Resilience:**

## Case Study #3:

**Efficiency:**

**Self-sufficiency:**

**Diversity:**

**Resilience:**

## Case Study #4:

**Efficiency:**

**Self-sufficiency:**

**Diversity:**

**Resilience:**