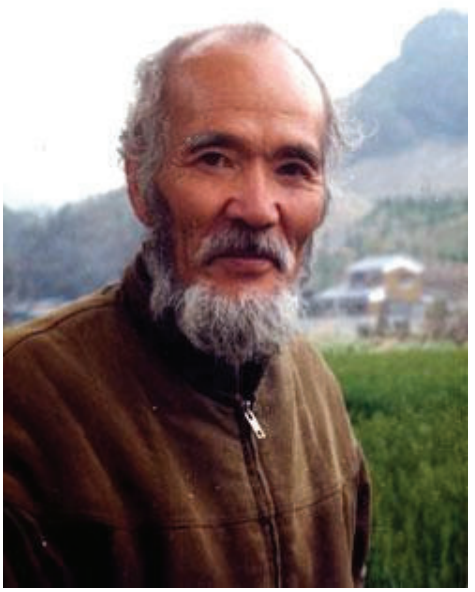
Lesson 5
Limits of the Scientific Method



Masanobu Fukuoka (1913–2008) was born on the Japanese island of Shikoku, the eldest son of a rice farmer and local mayor. After studying plant diseases and working as a produce inspector, he returned to his village in 1938 to focus on natural farming. During World War II, he worked as a food production researcher for the Japanese government but avoided military service until the war's final months.

After the war, he dedicated himself to farming and, in 1975, wrote The One-Straw Revolution, expressing his concerns about Japan's modernization. Later, Fukuoka worked on projects to fight desertification and continued farming into his eighties. He also wrote The Natural Way of Farming and The Road Back to Nature. In 1988, he received the Magsaysay Award for Public Service.

A. Let us read an excerpt from Japanese natural farming practitioner and philosopher Masanobu Fukuoka's celebrated book *One Straw Revolution*.

Before researchers become researchers they should become philosophers. They should consider what the human goal is, what it is that humanity should create. Doctors should first determine at the fundamental level what it is that human beings depend on for life.

In applying my theories to farming, I have been experimenting in growing my crops in various ways, always with the idea of developing a method close to nature. I have done this by whittling away unnecessary agricultural practices.

Modern scientific agriculture, on the other hand, has no such vision. Research wanders about aimlessly, each researcher seeing just one part of the infinite array of natural factors which affect harvest yields.

Furthermore, these natural factors change from place to place and from year to year.

Even though it is the same quarter acre, the farmer must grow his crops differently each year in accordance with variations in weather, insect populations, the condition of the soil, and many other natural factors. Nature is everywhere in perpetual motion; conditions are never exactly the same in any two years.

Modern research divides nature into tiny pieces and conducts tests that conform neither with natural law nor with practical experiences. The results are arranged for the convenience of research, not according to the needs of the farmer. To think that these conclusions can be put to use with invariable success in the farmer's field is a big mistake.

Recently Professor Tsuno of Ehime University wrote a lengthy book on the relationship of plant metabolism to rice harvests. This professor often comes to my field, digs down a few feet to check the soil. brings students along to measure the angle of sunlight and shade and whatnot, and takes plant specimens back to the lab for analysis. I often ask him, "When you go back, are you going to try non-cultivation direct seeding?" He laughingly answers, "No, I'll leave the applications to you. I'm going to stick to research."

So that is how it is. You study the function of the plant's metabolism and its ability to absorb nutrients from the soil, write a book, and get a doctorate in agricultural science. But do not ask if your theory of assimilation is going to be relevant to the yield.

Even if you can explain how metabolism affects the productivity of the top leaf when the average temperature is eighty-four degrees (Fahrenheit), there are places where the temperature is not eighty-four degrees. And if the temperature is eighty-four degrees in Ehime this year, next year it may only be seventy-live degrees. To say that simply stepping up metabolism will increase starch formation and produce a large harvest is a mistake. The geography and topography of the land, the condition of the soil, its structure, texture, and drainage, exposure to sunlight, insect relationships, the variety of seed used, the meth-od of cultivation—truly an infinite variety of factors-must all be considered. A scientific testing method which takes all relevant factors into account is an impossibility.

You hear a lot of talk these days about the benefits of the "Good Rice Movement" and the "Green Revolution." Because these methods depend on weak, "improved" seed varieties, it becomes necessary for the farmer to apply chemicals and insecticides eight or ten times during the growing season. In a short time the soil is burned clean of microorganisms and organic matter. The life of the soil is destroyed and crops come to be dependent on nutrients added from the outside in the form of chemical fertilizer.

It appears that things go better when the farmer applies "scientific" techniques, but this does not mean that science must come to the rescue because the natural fertility is inherently insufficient. It means that rescue is necessary because the natural fertility has been destroyed.

By spreading straw, growing clover, and returning to the soil all organic residues, the earth comes to possess all the nutrients needed to grow rice and winter grain in the same field year after year. By natural farming, fields that have already been damaged by cultivation or the use of agricultural chemicals can be effectively rehabilitated.

B. Watch this short documentary on Fukuoka using this QR code:

C. Listen to the song by Kafil Ahmed titled 'Masanobufukuoka' using this QR code:

D. Write a paragraph on your impression about Masanobu Fukuoka. Do you appreciate what he preached and practiced? Give reasons for your opinion.

E. Interview two farmers in your locality. If you live in a city, interview people who were once involved in farming. Ask them specially about "natural" and "chemical" farming. Try to discover advantages and disadvantages in different farming practices. Present your findings with your teacher and friends in class.

Arundhati Roy (born November 24, 1961, in Shillong, India) is an Indian author and political activist. She gained international fame with her debut novel The God of Small Things (1997), which won the Booker Prize. Alongside her literary success, Roy is known for her outspoken activism on environmental and human rights issues, often criticizing government policies. Her activism has led to legal challenges, but she continues to be a prominent voice in both literature and social justice movements.

F. We will now read an excerpt from Arundhati Roy' powerful and passionately written essay "Greater Common Good".

According to a detailed study of the 54 Large Dams done by the Indian Institute of Public Administration, the average number of people displaced by a Large Dam is 44,182. Admittedly, 54 dams out of 3,300 is not a big enough sample. But since it's all we have, let's try and do some rough arithmetic. A first draft. To err on the side of caution, let's halve the number of people. Or, let's err on the side of abundant caution and take an average of just 10,000 people per Large Dam. It's an improbably low figure, I know, but ... never mind. Whip out your calculators. 3,300 x 10,000 = 33 million. That's what it works out to. Thirty-three million people. Displaced by big dams alone in the last fifty years. What about those that have been displaced by the thousands of other Development Projects? At a private lecture, N. C. Saxena, Secretary to the Planning Commission, said he thought the number was in the region of so million (of which go million were displaced by dams). We daren't say so, because it isn't official. It isn't official because we daren't say so. You have to murmur it for fear of being accused of hyperbole. You have to whisper it to yourself, because it really does sound unbelievable. It can't be, I've been telling myself. I must have got the zeroes muddled. It can't be true. I barely have the courage to say it aloud. ...

Fifty million people.

I feel like someone who's just stumbled on a mass grave. Fifty million is more than the population of Gujarat. Almost three times the population of Australia.

More than three times the number of refugees that Partition created in India. Ten times the number of Palestinian refugees. The Western world today is convulsed over the future of one million people who have fled from Kosovo.

G. Watch two beautifully-made documentaries on Narmada Project titled A Narmada Diary 1995, and Drowned Out, 2002:

H. Answer the questions below:

1. What do you think are the main reasons behind the large number of people displaced by big dams?
2. How do you feel about the estimated number of 50 million people displaced by various development projects?
3. Why do you think the government hasn't made the displacement numbers official?
4. How do you think displacement from dams affects the lives of people in the long run?
5. What alternatives could be considered to reduce the number of people displaced by development projects like dams?
6. Why do you think the issue of displacement is not widely discussed or acknowledged?
7. How would you compare the displacement caused by dams to other global refugee crises?

I . Do you find a similar story in your own country? Research in groups and discuss the findings in the class.