

Chinese Permaculture

Earle Barnhart 2015

Farmers of Sixty Centuries

There are large regions in China where farmers have grown food on the same land for more than 6000 years. Over that time, several hundred generations of farmers developed a highly efficient, highly productive, sustainable agricultural methods. successful strategies and techniques were passed on by common custom and were recorded using a written language that preserved the information and allowed it to widely distributed through the centuries.



Intensive Crop Production to Maximize Year-Round Food

Polyculture of Crops. Chinese farmers maximized the amount of food produced by growing crops continuously on every square foot of land all through the year. They grew complex mixtures of crops at the same time, often 3 simultaneous crops at different stages. Continuous dense intercropping results in overlapping layers of leaves that absorb up to 95% of the sunlight through much of the year. They grew combinations of up to 160 varieties of vegetables, oil crops and fiber crops. Over the centuries, new crops from the Americas, such as sweet potatoes and corn, were incorporated into their already productive polycultures. Traditions' Chinese agriculture is much more productive of food per unit area than today's western mechanized agriculture.



Almost every plant was started in a nursery and transplanted to the fields by hand, placed into the polyculture whenever and wherever space became available. There was "...an almost universal practice of planting nearly all crops in rows and hills ..." to achieve close interplanting and still leave space to maintain the plants and harvest the crops. Growing crops on raised beds was eventually found it to be the most efficient method for high productivity at the household and community level. Grain was grown in larger, flat, often irrigated fields.

Seed Selection and Development of Locally Adapted Varieties of Crops

Each year farmers would save seeds from the current harvest to plant the next year. For thousands of years they selected the best seeds of the best plants that were both productive and adapted to the local climate, soil and weather. They gradually developed hundreds of varieties of rice, millet, soybeans, and other crops. This also resulted in developing a number of vegetables of which all parts are edible at virtually any stage - leaves, stems, seeds, and flowers.



Management of Rain and Water

"Water at the proper time is one of the prime factors of high production"
F.H. King

"For as long as the Chinese vegetable farmers can remember, they have always been getting up early in the morning to water their plants. This is when the water is needed most."
Peter Chan



WATER

Centuries of experience with drought and floods taught the Chinese that was worth any amount of effort to capture and control all rainwater. This avoided the gradual erosion of soil that over years and centuries, reduced damaging floods, and allowed water to be applied to crops in optimum amounts at the optimum time.

Catching rainwater and managing irrigation water starts at the smallest scale. Many individual plants were grown in single depressions that would be raised beds typically were flat on top with raised rims all around which would also hold rainfall and hold applied irrigation water. They gradually made almost every field perfectly flat with ridges around the edges to hold water; rainfall that hit each field would stay in that field and be absorbed, rather than run off and cause flooding elsewhere. A 2 inch rain over a large region would be caught and absorbed without erosion or runoff. In addition to rain, irrigation water was applied in the fields and beds by canals moving water from ponds and rivers to the fields. Small fields and home plots were irrigated by hand using highly efficient sprinkling cans carried on carry-poles to optimize water to the each crop and often each individual plant.

Recovery and Recycling Of All Organic Matter

When crops are harvested and removed from a field, the minerals that are in them are removed from the soil of that field. In order for the field to produce crops again of the same quantity, sustainably year after year, century after century, an equal amount of minerals must be added back to the field each year.

So Chinese farmers were 'fanatic' collectors and recyclers of organic matter. They recycled manure from pigs, chickens and ducks on each farm (the "... coarse food transformers...") that ate waste plants and materials that people could not eat. Animal manure was composted in piles, pits, or containers of water. They bought wastes from oil-seed presses, silk-worm farms, and rice hulling sites. They dredged mud from the bottom of ponds, rivers and canals to put on the fields. They cut branches from trees on mountainsides and buried them to rot in the fields for fertilizer.

A farmer typically kept a compost pile in a courtyard near his house. He would mix compost with soil and dry it to a powder. Each day in summer he would carry some to the fields and apply it in small amounts to individual plants, at the optimum time and rate that each plant needed them during their growth.

Human wastes were stored at the home and farm scale in special pits or containers, to be composted with other organic matter and isolated for a time to reduce pathogens in it. Human wastes were the richest form of waste organic matter. Human wastes from cities were collected and sold to farmers at a high price; the companies who did this work paid the government a fee for the right to collect and market the human waste nutrients, because it was very profitable business.

Grain

Traditionally Chinese people got 90% of their calories from grain - rice in the south, millet and wheat in north. Farmers needed to commit 70% of all cultivated land to growing grain, to provide each person about 160# of rice per year to eat. Most of the grain grown was kept and stored for home use. About 10% of an average grain crop had to be saved to plant the next year's crop. Some was taken as taxes to the government. If in any year there was an excess (on average about 10%) it would be sold.



In warm-climate regions two or three crops of rice could be grown each year in the same field. This involved 65,000 rice seedlings per acre, all transplanted, weeded, and harvested by hand. In the north three crops of grain could be grown every two years. – Legumes and beans were grown on 10% of the land, crops for cooking oil on 4%, root crops on 3.3%, and fiber crops on 3.6%,. Only 1% of the land was used to grow vegetables.

Transport

The Chinese people did the work of transport of most goods and materials. They used baskets on carry-poles and one-wheeled wheelbarrows known as "freight wheelbarrows ". With a carry-pole an average person can easily carry 50-60 pounds, their hands and arms are free, and only narrow foot-paths are needed. Chinese farmers did not use horses to plough fields , and generally did not transport bulk materials in horse-drawn carts or wagons. They committed very little or no land to pasture or hay.



Traditional Chinese Agriculture

Chinese agriculture reached its highest stage of development in the early 1900's, producing food for societies with high population densities, using few metal tools and no fossil-fuel powered machines. Through most of China's history, the average farm was operated by a single extended family including children and grandparents. A typical farmer's equipment was a few hoes and a sickle. Their cooking fuel (mostly for cooking in woks) was the dried roots of crops (rice, millet, and sorghum). Their sandals were made of rice straw. Traditional Chinese agriculture methods could provide everything that one person needed on an average of about ¼ acre of intensively cultivated land, a density of about 3-4 people/acre.

The Total Destruction of Traditional Chinese Agriculture in the 1950's and 1960's

Starting in the 1940's, Mao's communist government enforced a series of government orders that gradually destroyed nearly all the traditional Chinese agricultural infrastructure, tools and equipment, special crop varieties, expert traditional knowledge and traditional small village crafts. Mao's government used military-style organization to enforce laws from the central government instructing people what to do and not do. They understood virtually nothing about the complexities of the traditional agriculture. Military tradition has an 'extractive' concept of agriculture. Using a series land reforms, establishment of large communes, and forced work projects, the government gradually took all land, possessions and rights away from the rural population.

In the late 1950's, Mao's government eliminated private family farms, private ownership of tools and livestock, and private growing and cooking of food. The government seized all grain, did not leave farmers enough for eating or for seed for future crops. For years most grain was sold to Russia to finance industrial programs. The rural population was managed militarily and its agricultural labor was diverted to remote forced-work projects. After about 5 years of this, 36 million Chinese peasants in the countryside starved to death. Starving farmers would secretly eat unripe grain in the fields during the summer, so at harvest time came there was no grain to harvest. Near the end people dug up trees and ate the bark off the roots.

食物
FOOD

In the early 1950's, when it became obvious that military-style management of agriculture was a disastrous failure, the central government eventually allowed family-scale farms and private agriculture again. Peasants were allowed to have private food gardens again. It was the only thing that worked.

But severe irreversible damage had been done. The most knowledgeable farmers had been killed or had starved. Almost all of the highly adapted heirloom crop and varieties of livestock were lost. In many places the irrigation infrastructure was destroyed. Many houses buildings and tree crops had been destroyed to be used as fuel to melt down all the farm tools and cooking equipment in a government program of rural steel production.

Since then, in an attempt to recover agricultural production, the Chinese government began to adopt methods of western-style, large-scale agriculture. The government established and promoted large farms using western-style monocultures dependent on fertilizers, machinery and chemicals. But the highly productive techniques of polyculture and interplanting in small intensive plots are not conducive to mechanization.

Chinese Permaculture - Can We Do As Well? Or Better?

Although traditional Chinese agriculture is perhaps the most sophisticated form of permaculture ever developed, the details of traditional Chinese permaculture aren't studied, discussed or practiced anywhere in the West. They are virtually absent in the literature used by Western permaculture practitioners.

But written descriptions of the basic concepts and techniques can be found, and learned, from the references below, books about traditional Chinese agriculture. They include highly detailed descriptions of all the traditional tools and methods. These references provide the baseline knowledge that Western permaculturalists can use to achieve local food sovereignty.

Can we do even better? Today we have access to some information and technology that might allow a new better version of Chinese permaculture. We have plastic for waterproofing and better storage and sanitation. We have pipes for water transport that would make manual irrigation less laborious. We have scientific knowledge that is new. Traditional Chinese permaculture, aided by modern materials, transport, and scientific knowledge, could create a permaculture that is more sustainable and more humane than any that has come before.

The Farmer is the Algorithm

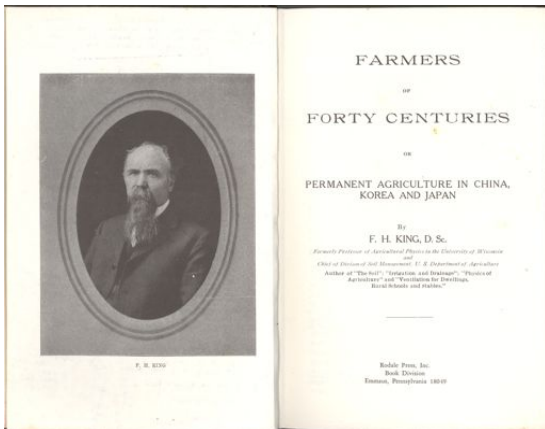
Most important is the idea that centralized, industrial, military-style management is not conducive to small-scale sophisticated agriculture. It is too far removed from the daily immediate reality of weather, soil, crops and available labor. In the ideal permaculture for the future, the farmer's mind and experience is the best algorithm for successful sustainable food production.

References

Traditional Chinese Permaculture

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- 1937. Rudolf P. Hommel "China at Work"
- 1984. Francesca Bray " Science and Civilization in China –
Volume 6, Part II –Agriculture
- 1985 Peter Chan "Better Vegetable Gardens the Chinese Way"
- 2010. Frank Dikotter "Mao's Great Famine"

1911



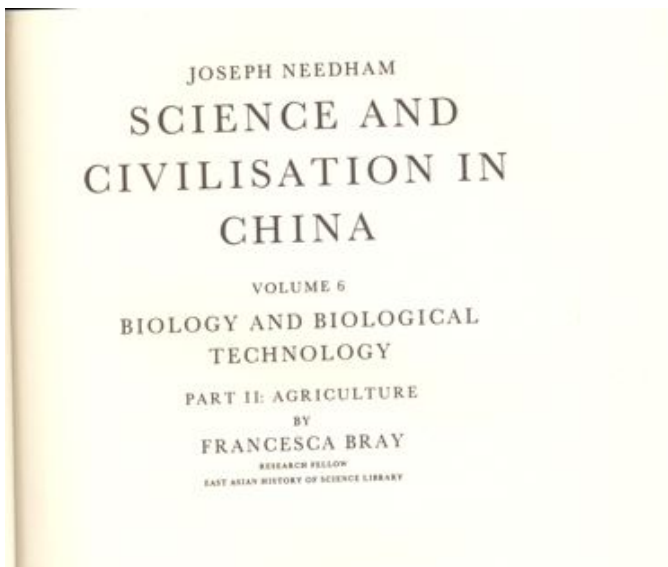
F H King traveled around China and Japan in the early 1900's documenting crop yields and fertilizer practices, logistics of transports, etc.

"We had come to learn how the old-world farmers had been able to provide material for food and clothing on such small areas for so many millions at so low a price, over so many centuries.." "...and do it for generation after generation without buying fertilizer."



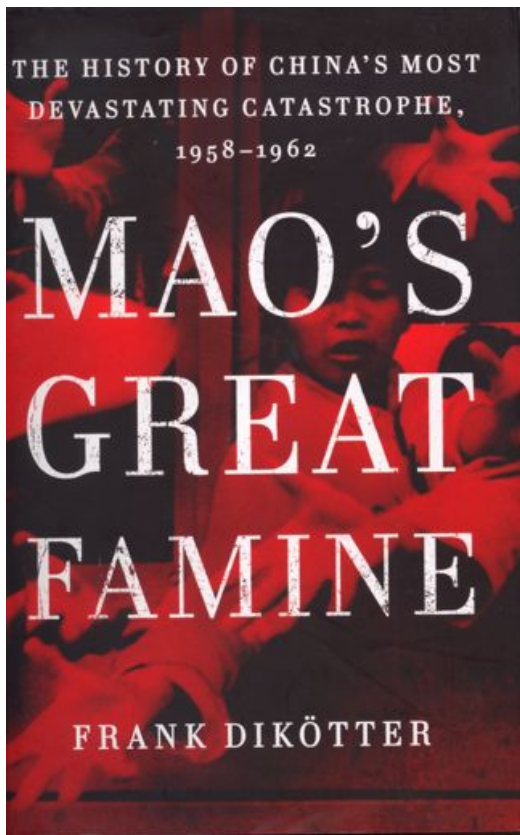
1937

China at Work
Rudolf Hommel described every single tool used in traditional China, and how they were used.,



1984

This is a heavy-duty academic research book, but it has amazing detail of cultivation techniques and strategies collected over 6000 years.

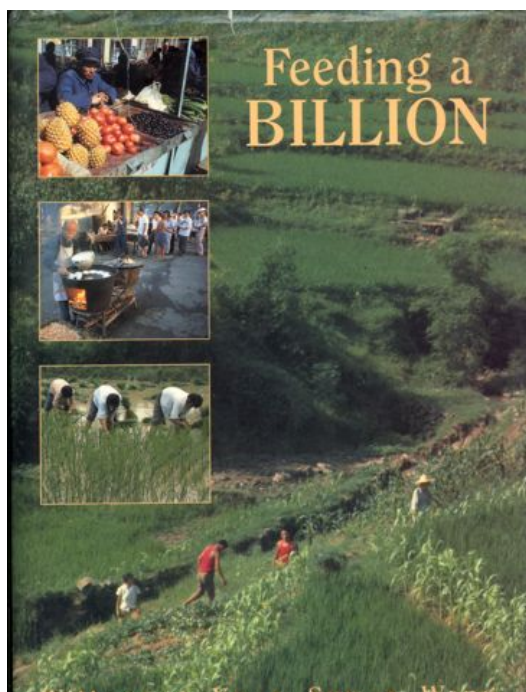


2010

Just when you're feeling really up about the potential all this highly evolved eco-technology, this book is chilling to read.

Mao, through a series of terror campaigns, land takings, forced migrations, mass killings, forced communal labor and other, he completely destroyed aspects of the traditional agriculture knowledge and systems and infrastructure.

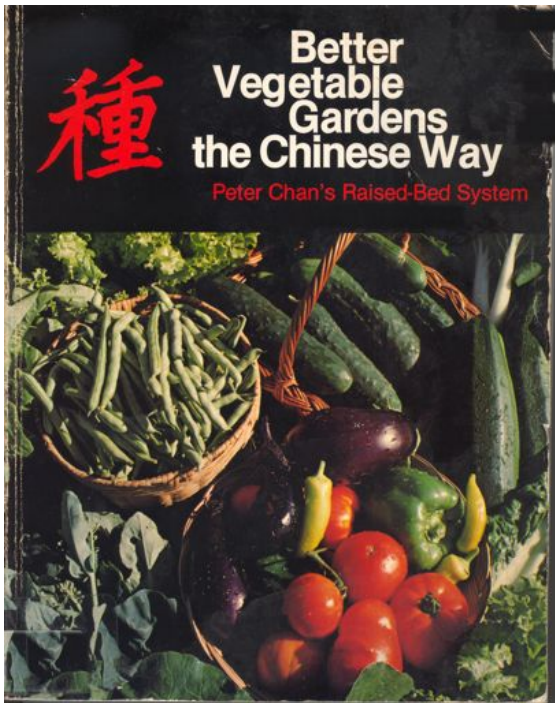
Farmers were forced to tear down their houses (for fertilizer) melt all their tools, destroy the old irrigation systems, kill the most skilled and knowledgeable farmers and craftsmen, eliminate any small-craft activity, etc etc.



1987

This is how China does agriculture in the last few decades. Includes chemicals, plastic, gasoline equipment, etc etc. Much of the traditional, but much has been lost.

Good sections on each major crop and animal.



1985

Peter Chan has knowledge of traditional Chinese garden methods and a Western scientific training. This is a practical "how - to" book for the home gardener.