Growing Food in South East Asia

Bruce French

Helping the hungry feed themselves

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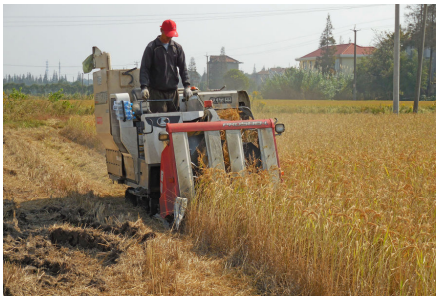
Growing food is one of the most important tasks in the world. About 800 million people in the world go to bed hungry each night. And many, many more suffer from malnutrition through not having the right foods to eat, or not knowing which are the right foods to eat.

Many people, especially in the rich world, suffer from obesity and all its bad health side effects from filling their stomachs with the wrong foods. More sadly, many poor people particularly in the tropical world, who don't have the chance to know any better, suffer under-nutrition or hidden hunger as their bodies lack micronutrients needed by our bodies to stay healthy. A child dies of under-nutrition in the world about every 10 seconds, and many adults lack energy from a shortage of iron in their diets or are short or stunted due to a lack of zinc. What we grow and what we eat is very important. Agriculture and nutrition and good health are something we all need to learn about.

But how we grow food depends on our "world view" or how we see the world and everything in it. Our Christian world-view is that this is God's world, created and sustained by him and that it is a good world. We are responsible to him for how we live in his world. So we then try to engage this world and treat the world with care and respect, rather than try to escape from this world and detach ourselves from this world, as if it is somewhere bad. In our agriculture we choose carefully suitable plants that suit our location, that are rich in nutrients and then we seek to grow them practicing "an earth-careful way of life". Around the world, much 'modern' agriculture is creating havoc and causing a crisis in the global environment and is the major cause of climate change. There are better ways of doing agriculture and growing food and many people are changing their whole approach to agriculture. The technical name for this approach is "agro-ecology" or "evergreen agriculture". This approach is based on growing plants in a more natural way that is good ecology and sustainable and doesn't have the bad side effects of the more exploitative methods that have become popular in recent years.

The food production practiced fifty year ago has been described as "solar energy" farming because plants used energy from the sun to produce food. Now much of what is being called 'modern' agriculture is being described as "petro-chemical" farming as it relies on fossil fuels to provide the energy needed for fertilisers, chemical sprays, machines, irrigation and other agricultural inputs. This so-

called 'modern' agriculture is going to fail as the world runs out of fossil fuels. Not only that but it has caused serious environmental damage and has serious health risks. Studies have shown that many food plants in Asia are being sprayed almost daily and on average up to 68 times with dangerous, toxic chemicals. This is usually because people are growing the wrong plants, the wrong way using the wrong methods. It is time for change.



Much of the traditional farming and food production in regions like north Thailand have used methods called "shifting cultivation" or "swidden agriculture". Even though this method is now not encouraged, and in fact in some places in starting to fail, it has several very good and very wise principles involved. Clearing the forest gives a good clean start for a garden. There are few weeds and not many pests or diseases that damage food plants. The trees have put down deep roots pulling up plant nutrients that have washed deep into the soil over previous years. These have been dropped on the surface in the leaf litter and often where the vegetation is burnt there is a ready supply of plant nutrients or natural fertiliser that is released ready to grow the next crop. As well, traditionally people have grown a wide variety of local plants and have grown them as a mixture of plants.

But as the population grows there is less land to farm and this has meant that the cycle of cropping for shifting farming land has got smaller and smaller. So there is less large vegetation to clear and provide nutrients and with longer cropping periods on any plot of land, the number of weeds increases and becomes a greater problem. As well, may people then start growing a much smaller range of food plants and often start growing them in rows using monoculture or large areas of one particular crop. Often the plant they start growing is one that someone has told them is an 'improved' or 'higher yielding' variety. So the methods change from being good and profound ecologically sound and stable ones to highly unstable ones dependent on sprays and fertiliser where money has to be spent buying seeds and fertilisers and sprays. This method not only means that some companies get rich from selling all the products but the diet usually gets poorer as 'high' yielding kinds have usually been selected for the amount of bulk they produce instead of all the critical and important micronutrients they contain. Having your stomach full of rice causes malnutrition.

Several studies have shown that growing plants commercially for sale often means the people spend their money on less nutritious foods and in fact do not end up with a more healthy diet. Usually men favour cash crops because they want the money and often don't spend it wisely. Women usually have a greater care and concern for their children and their health and education, so are often more committed to having a good food garden to feed their family well. The United Nations FAO says that even today, most food in the world in being grown by women. Women with their young children also spend a lot more time in the food gardens so are often more aware of detailed information and usually are more responsive to small practical suggestions that can be used to improve the gardening. Men often do the heavy work such as fencing, or digging.

In India a top scientist called Dr. Swaminathan has written a book called "The Evergreen Revolution" after he totally changed his mind about the approach called the "Green Revolution" where artificially bred varieties of crops, dependent on high levels of expensive chemicals were making rich people richer and making poor people not only poorer as food became more expensive but it also meant they were becoming more malnourished from the changes in diets. The United Nations Food and Agriculture Organisation have recently published a manual for Africa where they recommend people use locally available food plants and grow them in mixed culture where a variety of food plants are all grown in the one garden plot all mixed up across the garden. This approach is not only very good ecological agriculture but is much less likely to fail and produce a famine and also means the people have a richer and more nutritious diet.

The scientific reasons for this method are fairly simple and obvious. Local plants suit local conditions! They have already developed ways to survive local pest and disease problems and can tolerate changes in the weather. If they couldn't they would have already died out and would no longer be "local" food plants. Therefore people need to select and collect their planting material and seeds locally from these well-adapted plants. As well the most important rule for having a healthy diet is to eat a wide range of food plants. Then if one important nutrient needed by our bodies to grow and stay healthy does not occur in one plant, it will most likely be found in some other food plant. If we eat a wide range of food plants we will normally have a balanced diet. Rice is good for energy but lacks many of the very important other nutrients needed by our bodies to stay healthy. So we can have our stomachs full of rice and feel well fed, but in fact lack many of the other nutrients need to help us grow tall and stay healthy and be able to fight disease and have good eyesight and have blood rich in iron so that we have energy to work well.

If plants are grown mixed throughout the garden, then any disease that grows on one kind of plant will not spread quickly or easily onto other plants. This is because the disease organisms that wash in the rain or blow in the wind or spread by two similar plants rubbing together cannot spread and become a problem when different food plants that are not affected by this disease are growing next to each other. People only need to grow large areas of one variety of one crop plant in rows when they are dependent on machines to harvest the whole crop, at one particular time. For the 500 million smallholders feeding 2 billion people throughout the tropical world, mixed cropping with local plants is the best method. They need a variety of foods produced at various times throughout the year and these can normally be harvested selectively from the mixed garden, as the family needs them. Mixed cropping using a range of kinds of food plant is a safer and more secure way to feed a family well.

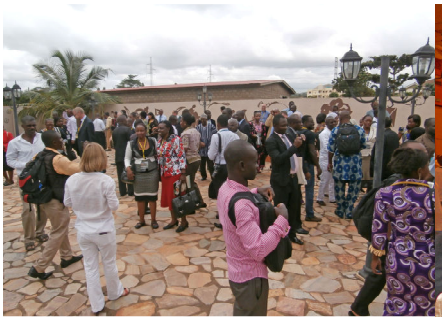
Thailand is a country that is rich in traditional or indigenous food plants. There are over 2,517 edible food plant species already growing in Thailand. Indochina or mainland SE Asia has 3,663 edible food plant species. Many of these have been overlooked or not given the study and attention that they deserve. Often food becomes less available towards the end of the dry season. As well, many foods can't be easily stored. So some food plants have an important role to fill these gaps. I read an important study on 50 traditional fruit tree species in arid areas in Africa. Not only was it realised that once these trees were established they usually grew with little extra care or attention, but they also produced their fruit in the middle of the dry season, when other food was usually scarce. But often people forget to plant fruit and nut trees as it seems too long to wait until they produce food and a quick growing annual food crop gets preference. But if the rains don't come or some other problem occurs with the annual crop then people either go hungry or starve.

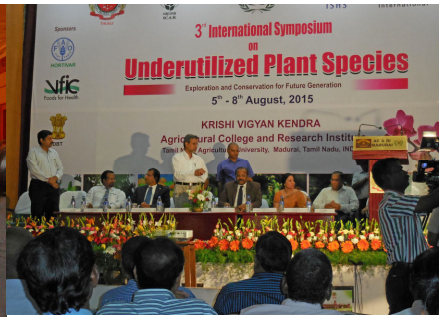
Because the number of people in the world as well as in SE Asia is increasing rapidly, people who have traditionally being using the method of shifting agriculture but need to change. With this method they rotate the garden plots around an area of land and allow the natural vegetation and bush to re-grow in between but as they have less land available they have to change these methods. But it is very smart to take the best principles of the older farming methods and to include these in any new method, rather than suddenly totally change the way of going about growing food. Under shifting agriculture with a bush fallow in between, soils remained fertile and weeds usually did not become a major problem. People kept the soil covered and grew a variety of plants and did not do a lot of digging or cultivation of the soil.

So what is the best way to achieve the best results in a new system of farming. In many places in Africa and tropical America, people have found that using mulch can achieve marvels in terms of protecting the soil, preserving moisture, and reducing weeds. A good soil is made up of millions of very small living things such as bacteria, fungi and other organisms. If the soil is left bare, these small living things die and cannot do their vital work of keeping the soil

healthy. Study of these soil and root micro-flora is one of the rapidly growing areas of scientific research. But we don't need to understand all the science to get started but simply need to put into practice methods that give us the benefits. Keeping the soil covered and reducing digging of the soil is a key principle of what is now being called 'Conservation agriculture" and is being used to re-store the millions of hectares of land and soil that have been ruined by less thoughtful methods based on excessive cultivation with large machines and the indiscriminate use of agricultural chemicals. For the benefit of the billions of people in Asia needing good healthy food, we need to learn quickly from these mistakes of the past.

In the last few years several international conferences have been held and several new organisations established to study again traditional food plants. Not only are they getting excited about how well these neglected and forgotten food plants will grow under a range of soil and climate conditions but they are also discovering that many are very rich in nutrients and often have other health benefits as well. This latter aspect means that some food plants are being called "functional foods" as it refers to all the other functions these foods serve as well as providing nutrients. The more careful and experienced older farmers often know about these benefits but this knowledge is being lost to younger people. People in Asia have a long experience of understanding medicinal plants. Most chemical drugs in the world have come from plants but drug companies have isolated the chemical and sell it to make large amounts of money.





When we talk about healthy food and good nutrition, people usually naturally understand two things. They know if their stomachs are full, as they no longer feel hungry. And they know if the food is rich in energy, as they then have enough energy to do a day's work. But there is much more to good food than bulk and energy. So people can get sick and die with their stomachs full of a starchy staple food. Often they look fat because their stomachs are distended. Not only does a child die of under-nutrition about every 10 seconds, but someone goes blind every minute from lack of Vitamin A and about 1/3rd of the people in the world are short of iron to keep their blood working well. Other nutrients like iodine and selenium can have serious health outcomes if they are not available in sufficient quantities.

Many people in Thailand and others countries in SE Asia and very short. When they go to live in some other country they often find their children then grow tall. This is not due to the change in scenery, but usually because the diets have traditionally lacked a nutrient called 'zinc'. This is usually found in nuts and kernels such as pumpkin or watermelon seeds. Zinc is important in over 100 different enzymes on our bodies and these are the chemicals that keep our bodies working well. So when zinc is lacking, not only are people short in stature but also have less resistance to disease and several other important functions within our bodies. Thailand has about 80 different kinds of trees that have nuts that can be eaten and most likely all of them are rich in zinc.

Most women and many men in the tropical world are anaemic or iron deficient. The best source of iron for our diets is from dark green edible leaves. Many people around the world, including tropical countries spend time and money growing the round or ball-headed cabbages. They are bulky so fill up stomachs so that people don't feel hungry but they have very little food value, except for a chemical in this plant family that help reduce stomach cancer. So it is possible to starve children to death filling their small stomachs with a bulky food that is low in nutrients. It also means the people have to spend money buying seeds to grow a not very useful plant. And for tropical countries it is the wrong plant in the wrong place. It belongs in temperate regions where it can survive frosts!

But that need not be a worry when God has provided about 1,150 other plant species with leaves that can be eaten that are already growing in Thailand. There are about 350 different kinds of trees in Thailand that have leaves that can be eaten. The advantage of these is that they don't have to be planted each year. But sometimes the young leaves for eating only appear in a flush of new leaves at particular times. Some of them are very attractive and tasty vegetables. There are another 380 small plants or herbs that have edible leaves. About 50 of these also have medicinal benefits of the type mentioned above. There are about 30 shrubs that can be used as edible hedges around houses and in village or between gardens beds. There are about 140 edible plant species in Thailand that can grow in swamp places.

In an interesting passage in the Bible in Isaiah 28 it says that God can teach people how to put the right plant in the right place. So good ecology and careful plant selection has been around as an idea for at least 2,500 years. The plants mentioned in Isaiah are ones suitable for Mediterranean climates but when I was looking up these plants, one of my large reference books said that as 2 of these plants were so similar, you could treat them just the same. In contrast, the illustration in Isaiah suggested that we take careful notice of the differences between the two. Good gardeners notice details that are important about their plants.

Then people burn vegetation and clean up their old leaves and plant rubbish by burning it two important plant nutrients get lost. These are nitrogen and sulphur and they are needed by new plants to grow and are lost from the garden by disappearing into the air with the smoke.

If you look at the oldest (lowest) leaves of a corn, rice or other grass plant you may be able to see a dry dead V shape going up the centre of the leaf. This shows the plant is running out of nitrogen. What the plant is doing is that it takes nitrogen from the oldest leaf, making it die, so that is can use the nitrogen to grow a new leaf at the top. But the trouble is that the plant does not get any bigger as an old leaf dies each time a new leaf grows. This shows that there is not enough nitrogen in the soil. Legumes or the bean family are a special group of plants that can actually take nitrogen gas from the air and turn it into the form of nitrogen that plants can use as a food source. They do this by small nodules or lumps on their roots. These lumps contain special bacteria that do this amazing work. If you break open one of these lumps on the roots of a bean family plant it should be red inside if it is doing this work properly. If it is green, it is not working properly. (The correct bacteria may not be present or the soil may lack a trace element called Molybdenum that is only ever needed in very small amounts.)

In Thailand there are over 200 legumes or bean family plants that can also be used as food plants. Some of these can be intercropped with other plants in gardens to improve the soil as well as provide nutritious food. Most bean family plants are rich in protein. Some, such as pigeon pea put down deep roots very quickly so can restore nutrients that have washed down into the soil and put them back on the surface. They do what trees did in the shifting agriculture systems. The leaves make good mulch. The leaves, seeds and pods can either be eaten or used as good quality poultry food. In the Philippines they have developed a technique called SLOPE agriculture where legume shrubs are put in rows across hillsides and then the leaves chopped off to provide mulch for the garden beds in between. Information about methods like this can be found on the internet. The shrubs help protect the soil and prevent erosion on the hillsides. Using creeping legumes like cowpea and velvet bean to cover the soil during dry seasons when other plants are not growing also protects the soil, improves the soil and can provide extra food. Peanuts are a legume or bean family plant easily grown in gardens and another similar African one called Bambara groundnut is becoming popular.

Sometimes tropical soils can become very acid or sour. Most plants need a fairly neutral soil and when soils become very acid plants often do not grow well. Adding crushed limestone can make the soils less acid. Soils in limestone rich areas can be the opposite and be alkaline. Some plants are suited to these areas while other plants will not grow well in alkaline soils. Over 100 food plants in Thailand are suited to growing in areas with a limestone soil. These have a special role in such areas.

Many self-sown and small fruit and nuts are often eaten especially by children, as they know they can eat them without feeling they are stealing food. There are about 70 species like this in Thailand. Almost 1,000 edible plants that occur in Thailand also occur in Yunnan in southern China. We can often find information from some nearby country that has studied these plants well.

12 propositions for addressing malnutrition and food production

1. ***Local plants suit local conditions.*** Local food plants fail less often as they suit and are adapted to the environment.

2. ***Maintain a diversity of food plants.*** For sustainable production and good nutrition use a diversity of plants as this gives more stable production and more balanced diets.

3. ***Share knowledge and learn from locals.*** Local people (especially women) are often familiar with plants but don't know their food values.

4. ***Collect planting materials locally.*** Locally selected plants have durable resistance, so get less disease and pest damage.

5. ***Use a mixture of plants throughout the garden.*** Mixed cropping reduces pest and disease problems, protects the soil and often reduces water use.

6. ***Grow dark green leaves.*** Local dark green edible leaves are often highly nutritious and can provide essential iron and Vitamin A (more available when cooked in oil).

7. ***Grow some perennial food plants.*** Tubers and trees can be important reserve foods. Food can become short in the drier seasons and some trees produce fruit at these times.

8. ***Put the right plant in the right place.*** People need to carefully match food plants to the right ecological zone. Include plants suitable for drier seasons when the rains don't come. Arid plants suit arid places. Swamp plants suit swamps.

9. ***Many traditional edible plants also have medicinal value.*** These uses are now being scientifically verified and they are called 'functional' foods because they have other functions besides providing nutrients. The soursop family has proven anticancer properties. Nettles are good for prostrate conditions.

10. ***Using local plants is low cost and offers easier availability***. Informing people on how to most strategically utilise local food plant resources empowers them to determine their own destiny and maintain their dignity. Adopting GMO seeds creates dependency on companies for seed, fertiliser and chemical sprays and does not help the poor.

11. ***Attractive, well-illustrated publications can change attitudes.*** Local plant names and nutritional data need to be provided. Better ways to flavour or cook local plants can enhance their adoption.

12. ***Use mulch and stop burning.*** Burning causes nutrients such as nitrogen and sulphur to be lost into the atmosphere***.*** Old plant material could be composted or often simply used as mulch to reduce loss of water by evaporation and help keep the soil alive by encouraging important soil micro-organisms.

For other information about food plants of the world and the principles for growing them you can refer to our website www.foodplantsinternational.com