



Rural Training Center-Thailand

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Community-based environmental education for the self-sufficiency and sustainability of small rural family farms

ชุมชนตามสิ่งแวดล้อมศึกษาเพื่อการพึ่งตัวเองและยั่งยืนชนบทขนาดเล็กครอบครัวฟาร์ม


You may post questions / comments to the Discussion area of our website

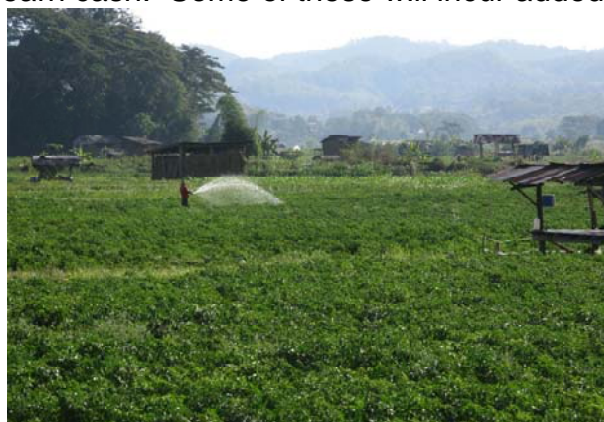
The Hot Season = Lower Water Levels



Water is at a very low level in the Nam Yang River as it flows past Ban Na Fa.

The hot / dry season has come. This is when water levels in streams, rivers, and reservoirs creeps ever downward. Scattered thunderstorms are possible now. But that usually means threats of flash floods in narrow canyons and adjacent lowlands. Mountain areas and steep sided valleys can experience landslides.

In our area, farmers long the rivers or near reservoirs need to pump water to irrigate their dry season crops. Without water, other farmers seek non-farm work to earn cash. Some of these will incur added expenses seeking work. 



Planting a dry season crop depends on water access.



No water = no crop = no income = more risk of poverty

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Living in Accordance with the Principles of Self-sufficient Economy



The King's Theory of the Self-sufficient Economy is not a rigid formula. At the risk of oversimplifying the theory, it is a systematic set of general guideline based on the King's observations of rural farmers in all parts of the Kingdom. In his theory, the King advises people to apply the guidelines adapted to the circumstances and conditions of their farms and local markets. There is no single rigid definition for self-sufficiency. Rather the King advises people to strive to be a self-sufficient as they can relative to their circumstances, resources, and capabilities.

Fundamentally, the self-sufficient economic process can be viewed in three phases:

Phase 1: People strive to live at a self-sufficient level which allows farmers to become self-reliant and maintain their living on a frugal basis.

Phase 2: Small farmers cooperate as a group in order to handle the production, marketing, management, and educational welfare, as well as social development.


Phase 3: People and businesses build up connections within various occupation groups and to expand businesses through cooperation with the private sector, NGOs and the government, work together in order to assist the farmers in the areas of investment, marketing, production, management and information management.

The RTC-TH focuses its time, energy, and activities at the level of Phase 1. Here is a summary table of how we try to apply the King's Theory.

King's Theory	RTC-TH Practice
1. One must adhere to a frugal style of living and try to cut down daily expenses especially for extravagant items as stated in the Royal speech, <i>"One should not live luxuriously and must cut down expenses in an appropriate manner."</i>	FUNDS (Farming Under No-Debt System): Reduce off farm spending, reduce / eliminate debt, avoid future major debts, live according to your means. Apply SAP (Sustainable Agricultural Practices) to bring balance to the farm and family. The RTC-TH advocates "growing what you eat, and eating what you grow" as a sign of self-sufficiency.
2. One must be true to oneself and work righteously as well as honestly, even under harsh living conditions according to the Royal speech, <i>"Success of all people comes from good conduct and proper work."</i>	Practice the Basic 5 Sila: <ul style="list-style-type: none"> • refrain from killing; respect all life • refrain from stealing • refrain from sexual misconduct • refrain from false speech • refrain from taking/using intoxicants.

King's Theory	RTC-TH Practice
<p>3. One must stop selfish competition and the habit of taking advantage of others when doing business as commonly happened in the past. This is defined in the following excerpt from the Royal speech,</p> <p><i>"The meaning of genuine happiness is the happiness derived from one's fair conduct, both of intention and action, and not from coincidence or taking advantage of others."</i></p>	<p>This is consistent application of the spirit and intent of the Basic 5 Sila and the RTC-TH principles Community-based Education (CbE) which embodies social responsibility and community service. CbE is predicated on caring, sharing, based on education from, to, and by the people in the local community.</p>
<p>4. One must not give up in finding ways to pull oneself out of hardship, by striving to learn more and more in order to earn sufficient income, as stated in the Royal speech,</p> <p><i>"The reason for encouraging people to learn more and become stable in their life is for their own lasting happiness from, first, leading a sufficient lifestyle, and then from being proud of themselves for being able to stand on their own."</i></p>	<p>The RTC-TH Community-based Education model advocates:</p> <ul style="list-style-type: none"> • Making education is a life-long endeavor • Finding people with knowledge and skills willing to share them with others who are willing to learn and to teach others • Using Teach backs as practical "exams" of lesson retention and proficiency • Realizing the true power of knowledge is realized when it is freely shared with others. • Getting more people should say yes to "Y.E.S." (Youth, Environment, and Sustainability). <p>Self-sufficiency in food is a fundamental start to family food security. Self-reliance comes before expecting government aid and subsidies.</p>
<p>5. One must behave with good morality and refrain from all greed. Thai society collapsed with this adverse economic situation [in 1999] because a lot of people betrayed their own country without any shame. His Majesty the King graciously delivered a Royal speech that conveys a similar message, as follows:</p> <p><i>"Avoid committing wrongdoings that will destroy oneself or others, eliminate one's inner greed, remain true to oneself, as well as preserve and enhance the good virtues within oneself."</i></p> <p>His Majesty accentuated that the most important word is "sufficient". If we are satisfied with living at a sufficient level which is reasonable for our status, we will then learn the true meaning of happiness.</p>	<p>This is consistent application of the spirit and intent of the Basic 5 Sila and the overall RTC-TH goals of self-sufficiency and sustainability for small rural family farms by de-emphasizing commercial agriculture until a stable, self-sufficient and sustainable family farm is established. Then small family farms are better able move to Phase 2 of the King's Theory by forming local cooperatives to achieve economies of scale.</p>

The implementation of the King's Theory began on our family farm with Tan Suttisan, Saifon's father in the mid-1970s. He studied the King's Theory and was the first farmer in the Jompra area to build a fish pond on his farm.

A key factor in our efforts is to reduce off-farm expenses in the area of expensive synthetic agricultural chemicals (e.g. herbicides, pesticides, and fertilizers). Controlling these expenses is entirely within the control of the family. 

On-Farm Materials for “Fortified” Compost



Compost can be easily “fortified” on the farm.

Synthetic chemical fertilizers can be a major off-farm expense. We advocate using compost to avoid using synthetic agricultural chemicals. But compost is not “fertilizer”. Compost is a natural way farmers can help build soil or improve their soil.

Commercial fertilizers are made around 3 basic elements: nitrogen (N), phosphorus (P), and potassium (K). Trace elements are sometimes added. These can all be found in natural materials available on the farm (see the table below).

	Nitrogen	Phosphorus	Potassium	Trace Elements
What it does	Develops leaves, stems, branches	Seed germination; develop roots, flowers, & seeds	Develops flowers, fruits, disease resistance	Contributes to overall good plant health
Where found on the farm	Manure, Blood meal, urine, Legumes	Bone meal, composted fruit	Wood ash, compost, composted fruit (esp. banana peels)	Leaf mould, Compost, Snail & egg shells



Manure from farm animals is a nitrogen source for our compost



Composting fallen fruit is adds phosphorus and potassium



Wood ashes from the kitchen stove are another source of potassium



Egg shells from the kitchen add calcium and other trace elements

By adding these materials to your compost, you “fortify” or enhance your compost. Essentially, you let nature do the complex chemistry for you. It is a well-known fact that resources are not evenly distributed on Earth. Your job is to collect the ingredients and put them in a convient spot (your compost pile) to let nature do its work. This promotes nutrient recycling on the farm.

Using compost is an easy way to “naturally” balance your soil. Studies have shown that compost tends to bring about a balance in soils. If a soil is to acid (low pH number), compost will bring it closer to neutral. The same is true if the soil is too alkalai (high pH number). If the soil texture is too sandy or too clayey, compost will bring it closer to loam (the balanced texture between the two extremes).

Fortified compost, worked into your soil puts the balanced ingredients where the plant roots can easily get to them. Soil fertility is the “right” soil characteristics (texture, structure, chemistry), water, and air that lets plant roots get to and take in the soluble nutrients from the soil. Compost “magically” improves the soil characteristics to make this happen. Fortifying your compost adds the needed ingredients to improve the available nutrients in the soil without the use of synthetic agricultural chemicals. **[Note:** Synthetic chemicals tend to persist longer in the environment, wash off farm land and potentially contribute significantly to water pollution.] 🌍

Worry-Free Chili Drying

Sun drying farm produce such as chilis is common during the hot / dry season in northern Thailand. The occasional thunder shower or dew in the early morning literally puts a damper on the drying process. Drying is delayed if no one is around to bring things out of the rain. If the produce is not collected and stored for the evening, early morning dew gets it wet. Delayed drying could mean not getting the goods to market on time.

Market timing is not a concern for us. But having one less thing to worry about due to busy schedules and unpredictable rain showers as well as saving time and labor makes life easier for us.

Pi Oi had mentioned that during the hot / dry season, the skylights makes the kitchen very hot. So we hung a shelf under the skylight to make use of the heat to dry our chilis. Radiant heat from the roof tiles speeds the drying process. And if it rains, the roof keeps rain off the drying chilis. Enough light comes through so the kitchen isn't plunged into darkness.

The skylight drying shelf is just the right size for our household needs. It certainly won't handle commercial quantities. But then we are striving for self-sufficiency rather than commercial farming. The plants in our garden produce chilis year round. So we can be drying chilies during the rainy season as well. There are sunny days between the rain. But the big advantage is not having to constantly watch for the rain and having to take in the chilies to avoid the soaking. 🌐



A common sight along the roads in the hot / dry season.



We use our skylight to dry chillies; rain is no problem.



Enough light comes through to light the kitchen.



The dried chillies are stored for later use.

In Our Home Garden



Cabbages growing in a discarded concrete barrel.



The health of these cabbages is obvious.

Tropical soils tend to be heavy (high clay content) and low in organics. It is hard for poor rural farmers to try to compost an entire farm. So we suggest starting with a family garden near the kitchen. The first composting could be done in the ground or in a container. Raised beds could be another way to start. Over time, the original heavy soil will be gradually amended.

[**Note:** Double digging is a faster way to “grow soil”. But many rural farms are populated by elderly grandparents and very young grand children unable to do the heavy work involved with double digging. We strive to find sustainable gardening methods suited to these age groups. This empowers them toward self-sufficiency.]

We got discarded concrete barrels from a neighbor. We filled them with a mixture of river sand, garden clay soil, and compost at a ratio of about 1:3:1. Earthworms were an added touch. Kitchen scraps were also composted in other barrels well before planting. Another benefit with our garden containers was significantly lower snail and slug problems.

In the past, we have grown potatoes, yams and carrots in these containers. The soil texture is ideal as there are no stones to “deform” or negatively affect the shape of the tubers.

Gradually, some soil from the container can be mixed into selected garden plots. The soil from the containers will have earthworm eggs. This will help spread more earthworms in the garden.

Edible morning glory seems to grow easily in the heavy clay soil. The large leaves provide good coverage for the soil to reduce rain drop impact (the first step in soil erosion). We have this growing in the garden as well as in the East fish pond.

A key advantage of self-sufficient sustainable farming is the biodiversity that is lacking in many commercial farms (which tend to have extensive cultivation of a single crop). Integrated bio-diverse farming can be done, but few do it. 🌍



Edible morning glory is a common vegetable dish.

Passive Solar Bird Chasers

Some birds see as our fish ponds as a free “all you can eat buffet”. Workers at the farm made a good effort to “re-use” discarded CDs as bird chasers around the fish ponds. They hung a CD on a string so it would swing and swirl the breeze. The shiny side would reflect sunlight and randomly “flash” to startle the birds.

It was a practical and clever idea. But as I sat in the fish pond sala, I could see the CD moving in the breeze. But I didn’t really see it reflecting sunlight and “flashing.”

The problem was the shiny surface of the CD was not really exposed to the sun’s rays to produce specular reflection (mirror-like reflectance). Rather than hanging the CD straight up and down, it should be held at an angle. Anyone who has tried to use a signal mirror is well aware of the need to hold the mirror at the proper angle to get the mirror to “flash” and signal rescuers.

A simple modification would be to tie the string to hold the shiny side of the CD at an upward angle to the string rather than just straight up and down. Putting more than 1 CD and canting the CDs in different directions would result in more “flashes” as the multiple CDs turn in the breeze.

A sample tilted array was made using 3 CDs. We did a simple field test by hanging it in the sunlight, then trying to get pictures of the “flashing.” The results are shown below.

Notice the 2 CDs are facing different directions. As the wind turns the array, the



The initial CD reflector bird chaser I saw on the farm.



It twirled a lot, but I didn't see it “flashing”.



The shiny surfaces of the CDs turn toward or away from the sun at different times. In the photos above, going from left to right, the reflection is bright, dim, and bright. The angle is a big difference to the CD hanging straight down in the picture at the top of the article. 🌐

Bugs: If You Can't Beat'em, Just Eat'em

International food experts suggest insects be an increasing part of the arsenal to fight world hunger. During the environmental training sessions we conducted in Los Angeles, we stressed avoiding and reducing the use of synthetic chemical pesticides, herbicides, and fertilizers. Integrated Pest Management (IPM) does much the same thing. The Thai farmers are hungry for knowledge, but they also have a local version that avoids the use of chemicals other than seasonings and spiced: They eat insects! Here are some of the varieties they eat. This is the ultimate in non-toxic pest control.

[Photos in this article are from the internet under education use clause.]



Jing Reed, Jing Kung (ground crickets; Acheta confirmata Walker)



Jee Koong (Mole cricket; Gryllotalpidae spp.)



Tak Ga Tam (grasshoppers; Chondracris rosea spp.)



Non Mai (silk worm larvae)



Tor (Was larvae; Vespa cincta)



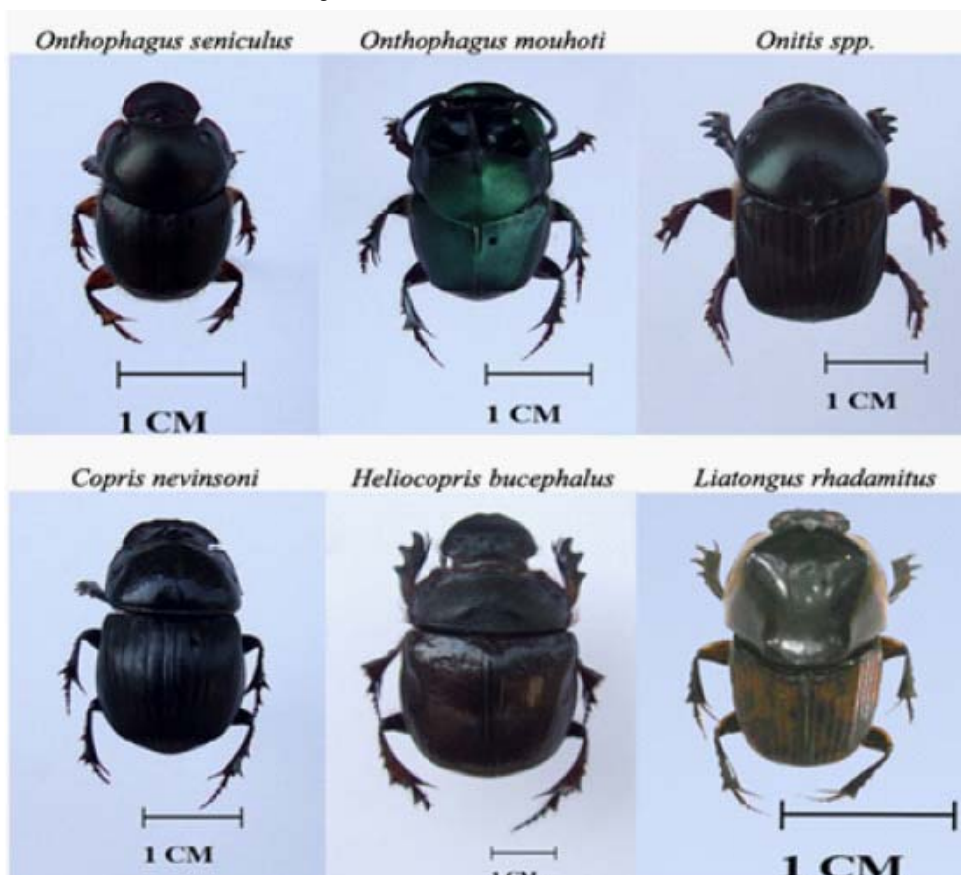
Maeng Da (Giant Water bug; Lethocerus indicus)



Khai mot dang (Red Weaver Ant eggs, *Oecophylla smaragdina*)



Non Pai (Bamboo worm; *Omphisa fuscidentalis* Hampson (Pyralidae, Lepidoptera))



Maeng Kee Noon (Thai dung beetle; 6 species)

A UN report stated that experts do not consider insects as a food resource in emergency relief efforts EVEN in areas where local people are known eat insects. Research shows insects contain protein, carbohydrates, and amino acids valuable for nutrition.

A study in 2008 reported 15,000 Thai families raised insects for food. Raising insects is basic, requiring little capital for start up.

It is light work suitable for the elderly and children. They can earn a livable income. They earned \$600-\$900 / month (in contrast to part-time farm work paying \$90-120 / month). What they don't sell, they can eat or grind up to use as animal feed supplement. Grasshoppers can decimate a rice crop. When Thai farmers found they could eat them as a snack, grasshoppers were gathered and sold to food vendors. So the farmers got rid of a crop pest, earned extra income, and could also have a snack! How's that for win-win-win IPM? So don't bug Thai farmers about non-toxic pest control, OK? 🌍

Emergency Preparedness: Fire Starter Kit



An empty pill bottle can hold a butane lighter, 9 VDC battery, and some matches.



A larger empty pill bottle can hold fine (#000) steel wool tied with an extraction cord.



Emergency fire starting in the humid (and at times very wet) tropics can be very challenging. In addition to local Thai friction methods using bamboo, our emergency kit begins with more modern “basics”: butane lighter, 9 VDC battery, and matches. These were put into an empty vitamin pill bottle as a “re-use” example rather than discarding it. This also keeps these items together in a more moisture resistant

container rather than a zip closure plastic bag. A bead of silicone caulking can make it water tight.

Fine steel wool (#000, often used in furniture finishing) is used as tinder to start fires in very wet conditions. This was also put into another empty pill bottle. To make extraction easier, the pads were tied together on a pull string. It can lit by any of the ignition devices mentioned above. When ignited, the fine steel wool will burn even when wet. Open flame from the butane lighter or matches will do the trick. Touching both battery terminals to the steel wool shorts out the battery to ignite the steel wool.

As with any fire starting activity, it is always best to prepare and gather all the materials first (i.e. tinder, kindling, fire wood, igniter) before trying to light anything. In an emergency, fire starting materials may be limited. So be sure to have MORE tinder and kindling ready before using your ignition materials. Small finer tinder and kindling will give you a much better chance of success.

When extinguishing your fire, consider “banking” it (covering the hot coals with a layer of sand/soil). This enables you to have ready hot coals the next day to start your fire. In ancient times, hot coals were carefully guarded and carried to the next campsite to assure having fire available. 🌐 **[Note:** We used these items as they were readily available. Other ignition materials: magnifying glass, metal strikers (e.g. flint/steel, magnesium bars) and friction methods (which take practice and proper materials).]