



Rural Training Center-Thailand (RTC-TH)

Fall FARM UPDATE

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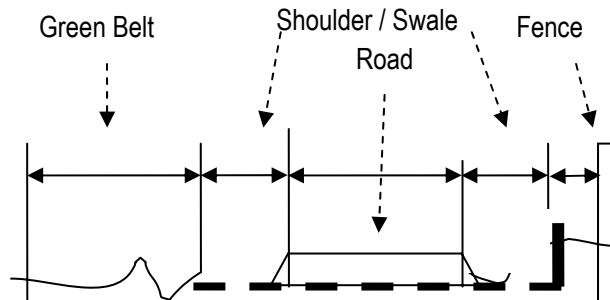
Oct 2007

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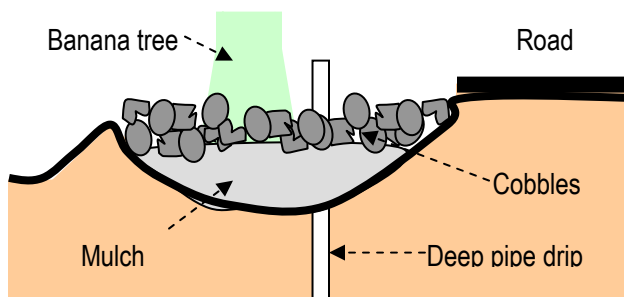
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Community-based Environmental Education for the Self-Sufficiency and Sustainability of Small Rural Family Farms



The general design for the 10-12 m wide multi-faceted fire break involves a mineral soil road surface flanked by a double barrier of banana trees. These high water content evergreen trees create a radiant heat barrier to protect the farm from off farm fires.



The green banana belt swale serves a number of purposes: 1) an evergreen fire break at the west edge of the farm as the first line of wildfire defense; 2) a planted flow path to protect against soil erosion; 3) a mulched swale to improve soil moisture retention of natural rain fall runoff; 4) a part of the anti-mosquito program (the use of cobbles prevents surface water from being available for mosquito breeding); 5) banana blossoms and fruit are food, the leaves are used in food preparation and wrapping; 6) the tree can be cut and used as a pig feed supplement; 7) dead leaves can be used for mulch or compost on other parts of the farm.

Green Fire Break

With the coming of the dry season, its time to put the new fire protection plan into motion.

The west boundary of the farm is the most vulnerable to fire. Our current thinking is to construct a multi-faceted fire break along the west boundary fence of the farm. It begins with a mineral earth perimeter road. The road will be bounded by swales parallel to the road. The swales will be planted with banana trees. Natural rainfall runoff will be directed to the swales. After planting the banana trees, the swales will be heavily mulched and covered with coarse gravel and cobbles. This will increase the soil moisture retention, prevent soil erosion, puddling, and the eliminates exposed standing water for mosquito breeding.

If necessary a supplementary deep drip irrigation system can be installed fed by the storage tanks from the rainwater harvesting system.

The road and green banana belt fire break will be backed up by a 10-meter low height vegetation zone before getting to any farm structures. Eventually, all farm structures will have a 1-2 m bare earth or concrete pad surrounding them to create a fuel free zone to protect the structures from wind blown embers.



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Efficient Irrigation Trial

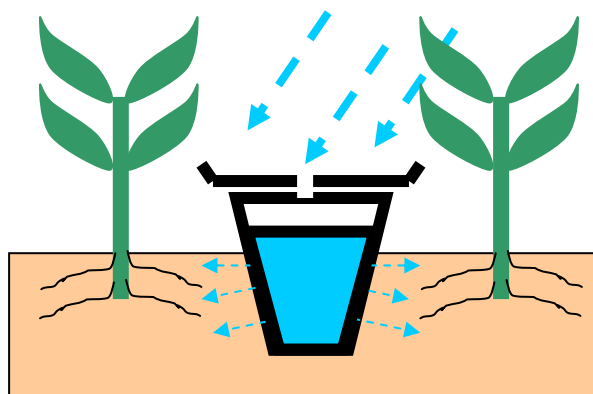
Connie, a volunteer from the 2005 summer trip, sent us a copy David A. Bainbridge's presentation showing a variety of water efficient irrigation methods used in arid regions. While our farm is not in a typical arid region, there is a distinct dry season, and droughts do occur here. And the long range northern Thailand climate change forecast is for long, hotter, and drier climate in the future. So the topic was of interest to us.

Two methods caught our eye:

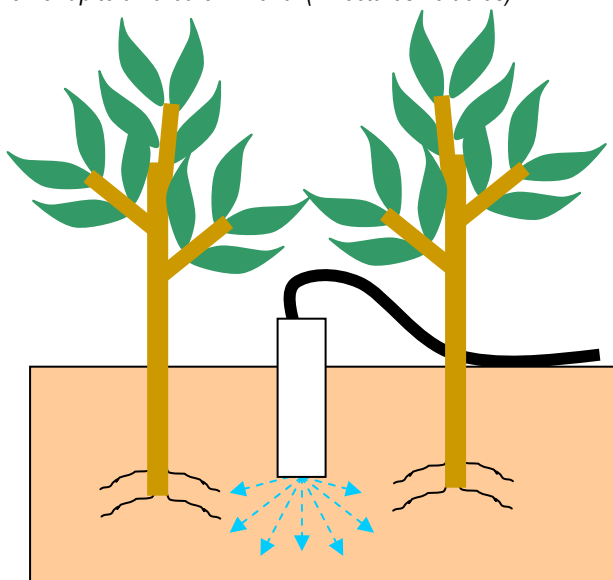
- **Buried Clay Pot (BCP):** An unglazed clay pot is buried in the soil. A plate with a small drain hole covers the pot opening. Rain water collects in the plate and drips into the pot. Water slowly seeps through the clay pot to the soil. The plant is placed in the soil next to the pot.
- **Deep Pipe Drip (DPD):** A short length of pipe is inserted vertically in the soil with an open end above soil and the opposite open end at the plant root zone (about 20 - 30 cm deep). The drip irrigation line is inserted into the top end of the pipe. The water is dripped directly into the soil at the root zone.

Both of these systems do not expose water at the surface. This reduces evaporation losses; fewer weeds get the water; no surface flow means no erosion; more efficient water use results in 90% water saving and higher plant yields for the water used; readily adaptable by a wide range of farmers; low cost; easy to install, use, and maintain.

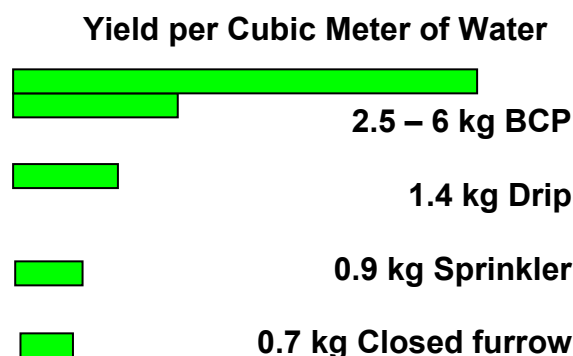
A key draw back is root development is restricted to the vicinity of the water source. So deep root systems may not develop in contrast to a more natural system. But this could be stimulated by deep pipe drip irrigation. ☺



Buried Clay Pot: This ancient technology is traced back 2,000 years in China. It can be used by small farmers for one plant or for up to an area of 12.5 rai (2 hectares / 5 acres).

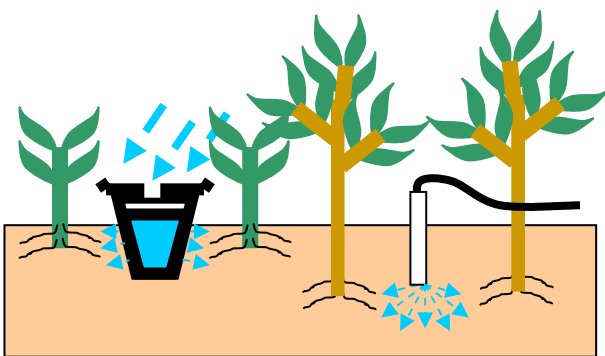


Deep Pipe Drip: Water is dripped directly to the root zone below the surface.

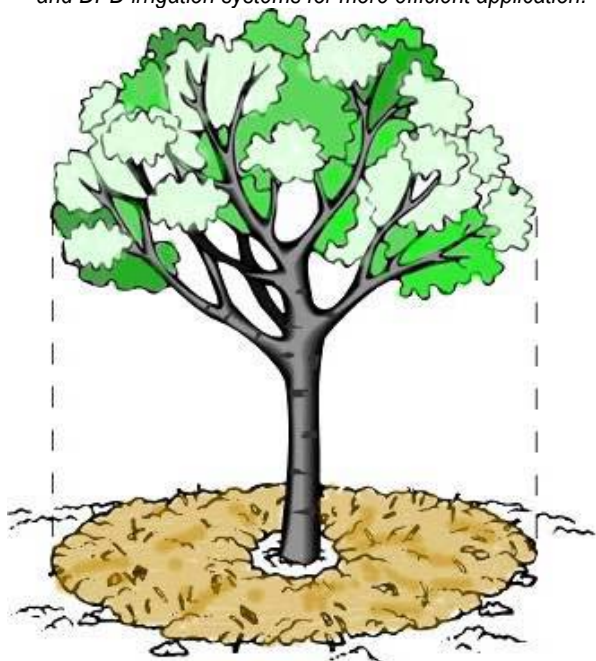


[Data from Bainbridge study.]

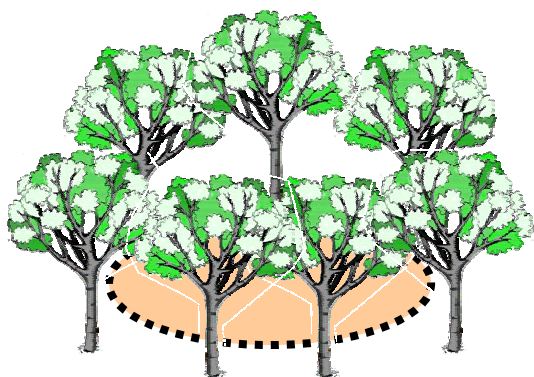




Compost tea and "worm tea" can be easily put into the BCP and DPD irrigation systems for more efficient application.



Mulch protects the soil from erosion and evaporation. Don't pile it up around the tree, and don't let it touch the tree trunk.



Tree planted around a shallow composting pit. For tighter spacing, use a hexagonal pattern... Compost is made in a shallow pit where all roots can access the food.

Organic Enhancements

Tropical soils are often characterized by low organic content. Increasing the organic content of the soil improves nutrients, soil organisms, and soil moisture retention. This is why we advocate no-till methods along with mulching, composting, and worm composting pits.

The use of BCP and DPD irrigation can also make the application of liquid organic enhancements more efficient. Compost tea and / or worm tea can be directly put into the pots or pipes to deliver these enhancements directly to the root zone.

Compost tea is readily made by putting compost into a cloth sack and letting it soak overnight in 4-5 liters of water. Worm tea is the liquid collected from worm compost bins. Dilute 1 part liquid to 10 parts water.

Mulch protects the soil from direct sunlight, high evaporation, and soil erosion from raindrop impact. As it decomposes, it adds organic matter to the soil. [Note: In orchards, the mulch should NOT touch the tree trunk.]

Worm composting pits are an efficient way to process animal manure and get nutrients into the soil. The worms speed up the composting process. In some cases, the plants are arranged in a circle around a shallow pit. Manure and other materials for composting are put in along with some worms. A bamboo screen cover keeps chickens from eating the worms. As the materials compost in place, the plant roots can access the nutrients from below the surface. When the compost is ready, remove the bamboo screen and let the chickens feed on the worms. So this system easily combines to feed both plants and animals.

Not all of these systems are in place on the farm yet. But they are planned for the near future. ☺



Water Ram Pump

Searching for a water pump to use in a rural setting with limited power supply choices and simple operation / maintenance led us to the water ram pump. This technology is about 200 years old. There are reports of these pumps working uninterrupted, non-stop 24/7 for decades.

The general principle is to have a water supply at a higher elevation than the pump. The flow volume determines how high the pump can lift water. In some cases, water flow of a few liters / minute located 2 m above the pump create enough force to lift water 20 m!

A survey will be done on the farm to locate potential water sources that could meet the minimum requirements of a ram pump.

Recent technological refinements enable some ram pumps to also pump air or to be adapted to do work similar to reciprocating engines. These applications are suitable to the rural setting for the RTC-TH.

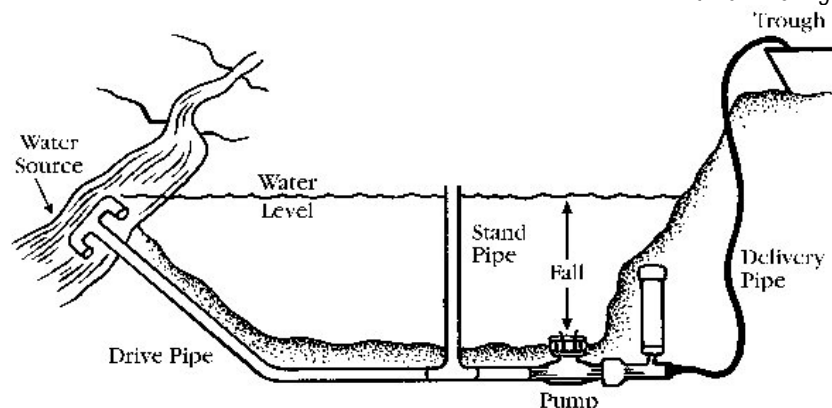
While some pumps are produced commercially, there are others that can be made using off the shelf parts at low cost. As with most technology, adapting to local conditions (economically, socially, and culturally) means the difference between success and failure. ☺



A ram pump uses flowing water as the power supply.



With few moving parts, the pumps have a long life span.



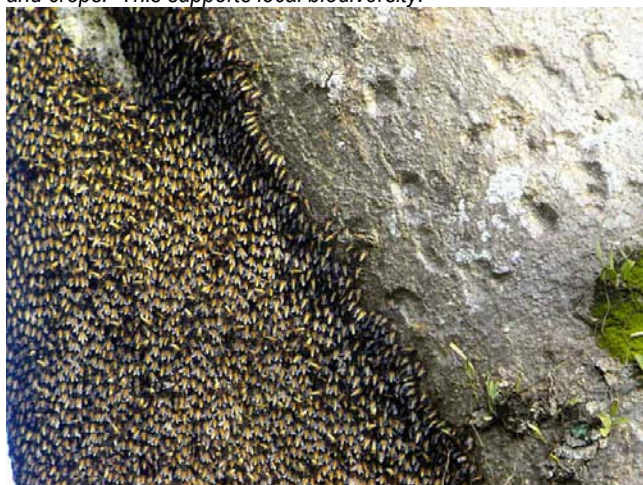
The key factors for a successful ram pump operation: water supply of adequate volume located **above** the pump. The flow rate / volume should be reliably consistent. Once the pump starts operating, it cycles continuously as long as the water supply is uninterrupted.

With few moving parts, ram pumps have been known to operate 30 – 40 years non-stop, lifting water several 10s of m higher than the elevation of the pump.

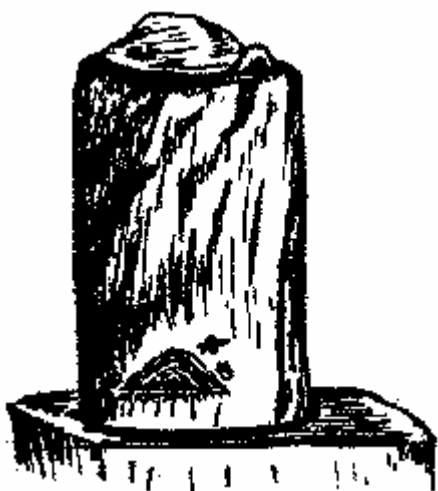




Apis cerana (left), the Asian bee and Apis mellifera (right) the European bee. Local bees are adapted to pollinating local plants and crops. This supports local biodiversity.



A beehive in a tree in the forest.



Traditional log beehive. Tang Suttisan, founder of our farm, used to make and maintain this type of beehive on our farm.

Protect the Pollinators

Recent studies in the US indicate a major concern over the loss of bees. Pollinators are critical to a successful harvest. The wide use of agricultural pesticides has led to killing both pest and beneficial insects.

The wide-spread use of the domesticated European honey bee has also seriously displaced many local bee species. A critical difference between the domesticated and wild or native bees is their behavior in the “off season.” Domesticated bees are often placed in box hives near the field or orchard crops they pollinate. Farmers then move the hives as to various fields and crops as needed. During non-crop seasons, the hives must be maintained by feeding the bees.

Wild or local bees normally live in forests and are used to foraging (searching) for food. Farmers can provide hives for wild bees near the edge of the forest near fields and orchards. The bees are used to searching for their food. Crops are densely clustered and are easier for the bees to find. In non-crop seasons, the bees fly into the forest to search for food.

The bee crisis in Thailand is the loss of the native bees. They are being displaced by the European honey bee used by many “richer” farmers. This bee is easily handled by beekeepers. But most rural Thai farmers cannot afford to keep these bees.

The RTC-TH encourages local farmers to build beehives to encourage wild bees to take up residence at the edge of farm fields. This is especially needed on farms next to forests. ☺