

# Soil Solarization for Healthy Seedlings and Increased Crop Production



## Producing Healthy Seedlings with Soil Solarization

Soil solarization is a technique for disinfecting soil that involves trapping heat from the sun under a transparent polyethylene sheet. This technique is an easy and inexpensive way to produce healthy seedlings free from nematodes and other soil borne diseases without any chemical applications. Solarization has been used as an IPM system for production of fruits, vegetables and legumes in many different countries. A seedbed covered with transparent polyethylene is shown below (Fig. 1).



Fig. 1: Seedbeds covered with transparent polyethylene

### Advantages of Soil Solarization:

- Cost-effective (need only transparent polyethylene sheet to cover the seedbed)
- Requires less seeds (higher germination percentage after solarization means less seeds are required)
- Produces healthy and vigorous seedlings (disease and nematode free seedlings)
- Less nematode and disease incidence were observed on seedlings produced from solarized seedbeds even after transplanting in main fields. For this reason, seedling mortality is lower for seedlings produced from solarized seedbeds.
- Crop production is higher. Rice grain and vegetable produce are bigger in size and more attractive. Production is increased 20 to 30 percent.

### **Proper Time for Soil Solarization:**

March to May is the best time for soil solarization in South and South-East Asian countries. In addition for South Asian countries, solarization is possible in the post-monsoon months of September and October.

### **Method of Soil Solarization:**

- ❑ Select the field for seedbed; it should have abundant sunlight, no shade
- ❑ After ploughing and leveling the land prepare a seedbed according to the width and length of polyethylene sheet
- ❑ Apply water and moisten soil to 15 – 20 cm deep
- ❑ Dig a trench around the seedbed. Cover the top of the seedbed with transparent polyethylene. The edges of the polyethylene should be in the trench. Do not use colored polyethylene.
- ❑ Fill the trench with soil (Fig. 2) to prevent air movement into the seedbed. Care should be taken to prevent any breakage of the polyethylene.

If the polyethylene breaks or tears, fix it as soon as possible with plastic tape.



Fig. 2: Filling trench around the polyethylene sheet with soil

- ❑ After three to four weeks, remove the polyethylene and plough the soil with a hand spade. After two to three days, level the soil and sow your seed
- ❑ Solarized seedbeds require 20-30% less seed compare to normal seedbed due to the higher germination percentage (Fig. 3)



Fig. 3: A solarization demonstration plot for farmer field school

**Indicators of an Effective Solarization:**

- ❑ The outer surface of the polyethylene will be very hot
- ❑ Water droplets will be seen on the inner surface of the polyethylene (Fig. 4)



Fig. 4: Water droplets inside the polyethylene

- ❑ Weed seeds will germinate easily but they die within a few days due to the high temperature under the polyethylene
- ❑ Solarized soils are slightly darker and no live weeds or grass will be seen (Fig. 5-right).



Fig. 5: Non solarized & solarized soil

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