
Gardening in Volcanic Ash

Our note in EDN 35 about farming in volcanic ash in the Philippines resulted in some networking at its finest. We now have a lot more information to share. A big thanks to those who wrote.

Ken Turner with Mercy Corps sent an interesting letter and pictures. "I guess I'm your reporter on the spot. Our community and my home (until the eruption) is 15 km from Mt. Pinatubo. We evacuated June 7, two days before the first major eruption. One of our staff returned a few weeks later. It looked pretty dismal.

"Now it is a different story. Some pretty amazing harvests have drawn a lot of attention. Banana planted a few weeks before the eruption produced a good crop. Most amazing was the watermelon harvest -more than twice the yields of past years, melons (sugar baby variety) twice the size on the average and still sweet, and vines more than twice the usual length.

"The ash is now about 8 inches (20 cm) deep. The soil has remained moist (and I suspect cool) under the sand, even after 3 months of dry weather. I did not check the pH, but 30 km from the mountain the pH is about neutral. It appears that sweet potato is thriving in rice fields 30 km from the volcano.

"The crops and generally lush growth is encouraging farmers to return, even though the road is likely to become impassible early in the rainy season. "

Victoria Coronel with IRRI sent very specific and helpful recommendations. Highlights are summarized below.

The eruption of Mt. Pinatubo brought havoc to more than 38,000 ha of farmland. Even though the Philippines has several active volcanos, they could find no published reports of studies on revegetation.

Some findings from the Mt. St. Helens volcano in the United States are relevant. (1) Ash has a lower permeability than soil. This means that flood water will remain longer on the surfaces of the ash-covered soils. (2) The ash layer acts as a surface mulch both reflecting solar radiation (increasing photosynthesis) and impeding water flow and evaporation from the soil to the atmosphere. An estimated 40-60% of the light is reflected. Peak daytime soil temperatures beneath 2-3 cm of ash were 6-10°C lower than adjacent sites where ash had been incorporated into the soil. (3) The abrasive effect of ash particles is harmful to insects. Unfortunately beneficial insects were the most affected.

Studies from Mt. Galunggung in Indonesia provided the following insights. (1) Crop yields were still high in areas with up to 20 cm of volcanic materials. Productivity declined with greater amounts. (2) Yields of rice and other food crops were high when the ratio of volcanic materials to soil were as high as 5:5 and 7:3. If there is less than 20 cm of ash, plowing into the soil seems the easiest solution. If deposits are deeper, adding organic matter may be needed (20 t/ha manure or other organic materials). Dumping organic waste from Manila has been suggested, but transportation is a problem. Green manure crops may be the answer.

The following cropping pattern was suggested if volcanic materials are less than 20 cm and the irrigation system is intact. After plowing 30 cm deep (a 7:3 ratio of volcanic materials to soil), plant rice-rice-corn/ soybean or rice-rice-leaf onion. For 20-30 cm thick deposits, plow the volcanic material when dry, incorporating any organic material that is available. Food crops can be planted in the early rainy season. Rice and corn are not generally recommended. If volcanic materials exceed 50 cm, pineapple would be suitable since it thrives well in sandy soil with pH range of 4.5-7.15 and requires minimum care and inputs. Hybrid coconuts can also be planted. Fruits like guavas, nangka [jackfruit], papaya and banana grew well, even better than before the eruption of Mt. Galunggung.

Preliminary tests show some rice varieties do better than others. The top 3 were all varieties grown in acidic areas of Indonesia. In one area, corn exhibited early leaf yellowing (corn requires a lot of nitrogen). Sweet potato gave the best growth, followed by kangkong and cassava. Green manures also gave initial excellent growth. A second eruption destroyed the experiment.

IRRI recommends that the above fruit trees be planted as quickly as possible for the longer term; that sweet potato, cassava, kangkong and green manures be planted for the intermediate term; that livestock that eat roots (e. g. swine) be associated with sweet potato and cassava growing; that aerial seeding of green manures, including ipil-ipil [*leucaena*], be considered.

Scientists desiring to see the entire report, "Mt. Pinatubo Controlled Revegetation" by B. S. Vergara and V. Coronel can write to Dr. Coronel at IRRI, P. O. Box 933, 1099 Manila, Philippines. Workers outside of Asia can write to ECHO.