

A Rock Dust Primer

RTE Resource Directory

It is now extremely practical to purchase a commercial rock dust product dedicated to gardens and farms! Please take a look at our RTE resource directory online.

https://www.remineralize.org/mineral-products_1/

The Benefits of Remineralization

- Provides slow, natural release of elements and trace minerals.
- Increases the nutrient intake of plants.
- Increases yields and gives higher brix reading.
- Rebalances soil pH.
- Increases the growth of microorganisms and earthworm activity.
- Builds humus complex.
- Prevents soil erosion.
- Increases the storage capacity of the soil.
- Increases resistance to insects, disease, frost, and drought.
- Produces more nutritious crops.
- Enhances flavor in crops.
- Decreases dependence on fertilizers, pesticides, and herbicides.

Which type of rock dust is best?

Remineralization creates fertile soils by returning the minerals to the soil much the same way the Earth does: during an ice age when glaciers crush rock onto the Earth's soil mantle and winds blow the dust in the form of loess all over the globe, when volcanoes erupt spewing forth minerals from deep within the Earth, and from alluvial deposits.

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↓Period																			
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3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr	
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe	
6	55 Cs	56 Ba	* 71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn	
7	87 Fr	88 Ra	* 103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo	
			* 57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb			
			* 89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No			

Within hard silicate rocks are a broad spectrum of up to 100 minerals and trace elements necessary for the wellbeing of all life and the creation of fertile soils.

Glacial moraine or mixtures of single rock types applied to soils create a sustainable and superior alternative to the use of ultimately harmful chemical fertilizers, pesticides, and herbicides.

We are all familiar with composting, recycling the organic matter back into our soils, but to create fertile soils we need to not only recycle the organic matter, but the inorganic matter as well. Rocks!

In his book, *The Survival of Civilization*, John Hamaker suggested using finely ground glacial gravel. Glacial gravel, which is a natural mixture of rock types, will create a broad spectrum of minerals in the soil in a



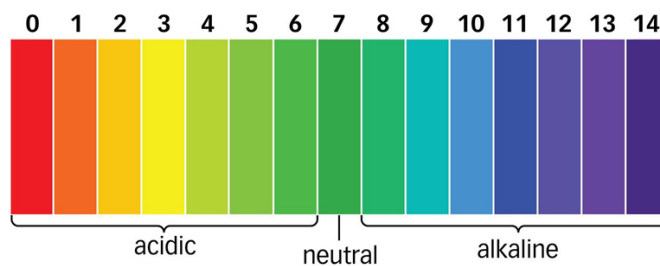
natural balance. Basalt is also an ideal source and more available in regions where there are no glacial deposits, particularly in subtropical and tropical regions. There are many hard silicate rock types available that are suitable including granite, andesite and others.

Glacial Gravel

Composting with rock dust

Combining rock dust with organic materials in compost is a great way to remineralize soils and speed up the composting process at the same time. Don't forget a handful of soil to inoculate with organisms. Rock dust improves aeration and structure and therefore prevents decay. Rock dust is assimilated even more quickly in compost than in poor soils. Compost and rock dust are a symbiotic combination: compost provides an excellent environment for the rapid growth of microorganisms, increases the organic matter, reduces erosion by holding the soil in place, and causes a reduction of odors. Add 2-20 lbs (1-12 kg per cubic meter) of rock dust per cubic yard of compost if you are making a compost pile or "windrow" composting.

Soil acidity



Soil acidity (its pH) should be measured annually. If the soil is acidic, an initial application of agricultural limestone can be added together with rock dust to neutralize the soil's pH. Over time rock dust will neutralize soils, but limestone is a quick remedy. Limestone is not recommended in forests as it will destroy the humus-building complex over the long-term. You can google or take a look at this link for how to test your soil pH [Three Easy Soil pH test Methods](#).

Keep insects in natural balance in your garden



In the long term, the silica in rock dust creates hardier plants and trees that will not be vulnerable to insects. Spraying very fine rock dust directly onto plants and trees helps to quickly save crops from insect infestations.

The rock dust gets into the segments of the insects, hurts their waxy covering and disables them. This takes care of an infestation without wiping out all the insects. Rock dust scattered around the garden helps protect it from slugs. It's important to remember that insects have a very important role. They are nature's recyclers, looking out for weaker plants to break down. This is a natural solution to maintain insect balance.

How to apply rock dust

There are many ways to apply rock dust to the soil; which method you use depends on the scale and your preference. It can be spread by hand out of a wheelbarrow, or rototilled and disked in. It can be applied with a manure or fertilizer spreader or an “E-Z flow” type fertilizer applicator. You can also use rock dust in a potting soil mixture made of compost, potting soil and peat moss. And if you have added rock dust to compost it will be incorporated into the soil when you add your compost.

Tom Vanacore from Rock Dust Local provides detailed advice:

Pulverized rock powders can be spread in traditional drop spreaders with large openings in the trough. Any damp lime spreader wagon or truck mounted sand and salt spreader will effectively spread any gradation of rock dust except the dry stone flours. The grits-to-dust gradations can be spread like lime, in live floor lime spreaders and augur driven applicators. Any rock dust may be spread by hand. Highly micronized stone flours can be entrained in water for foliar or irrigation applications or to create slurries and conveyed using diaphragm or rotor-stator pumps. Rock dust can also be added to manure spreaders on top of the load if spreading from conventional spreaders.

Micronized rock dust can be added to liquid manure systems at the time of pumping or in the spreading tanker. Rock dust can be added to compost raw materials to build a remineralized compost fertilizer. Please note: Pulverized rock powders will not spread in cone type three point hitch setups. These require granulated or pelleted materials. Caution! Rock dusts often contain silica. Dry stone powders present a breathing hazard. Wear suitable respirators, work up wind and limit exposure.

When to apply rock dust?

Whether you are a farmer or a gardener, the ideal time to apply rock dust is in the fall with a cover crop. Otherwise in the spring, but rock dust can be applied at any time during the season. Spring tillage is traditional.

Tom Vanacore explains various times to apply rock dust:

Apply rock dust powders with other soil amendments to new or established planting beds at the same time. Fall tillage or top dressing applications are extremely valuable. Rock dust incorporated in the fall assimilates over the winter and is available during the spring growing season. Apply with planting of overwintering tubers such as garlic, broadcast over hay land, or pasture. Apply whenever cover crops are tilled in preparation for new plantings. The charge of micronized minerals will stimulate microbial populations and make the nutrients more available to the new crop. Micronized rock powders can be suspended in water for “fertigation” and foliar use any time during the growing season. Top dressing or side dressing can be done during the season at any time. Adding a fine covering of stone flour gradations of rock dust to the soil surface of potted plants and watering in every month is good practice, especially during seasons of vigorous growth.

How much rock dust to apply?

Depending on the quality of your soil, you can add 1-10 tons per acre, an average application would be 3 tons per acre. The more rock dust added, the longer the application will last. An application of 3 tons per acre could last a few



years or longer and an application of 10 tons per acre could last for many years. Farmers also apply rock dust more often in smaller amounts similar to conventional plants applications, but that is more labor intensive. The Application Conversion Chart helps you determine how much rock dust to add depending on the size of your plot.

If rock dust is applied before the crop, work the rock dust into the top few inches of the soil.

An important criteria for deciding the amount of rock dust to apply depends very much on its fineness. The finer the rock dust, the less you need to add. If you buy a commercial product which will be more expensive, the rock dust will be very fine and may all go through a 300 mesh screen, like flour. If you look for a local source of rock dust, it is coarser, the byproduct is often about 70% going through a 200 mesh screen. In this case you can add more rockdust and the coarser material will break down over time.

Rock Dust Local in Vermont offers a product called Brix Blend. This material is a mixture of fine and coarse material supplying the nutrients both immediately and over time.

Rock dust quantities for application

Approximate Application Rate Conversions (tons/hectare)

$$7.5 \text{ t / ha} = 750 \text{ kg / 1000 sq.m} = 75 \text{ kg / 100 sq.m}$$

$$25 \text{ t / ha} = 2.5 \text{ t / 1000 sq. m} = 250 \text{ kg / 100 sq.m}$$

$$50 \text{ t / ha} = 5 \text{ t / 1000 sq.m} = 500 \text{ kg / 100 sq.m} = 5 \text{ kg / 1 sq.m}$$

Approximate Application Rate Conversions (tons/acre)

$$3 \text{ t / a} = 14 \text{ lb. per 100 sq. ft.} = 1.25 \text{ lb. per sq. yd.}$$

$$10 \text{ t / a} = 46 \text{ lb. per 100 sq. ft.} = 4 \text{ lb. per sq. yd.}$$

$$20 \text{ t / a} = 92 \text{ lb. per 100 sq. ft.} = 8 \text{ lb. per sq. yd.}$$

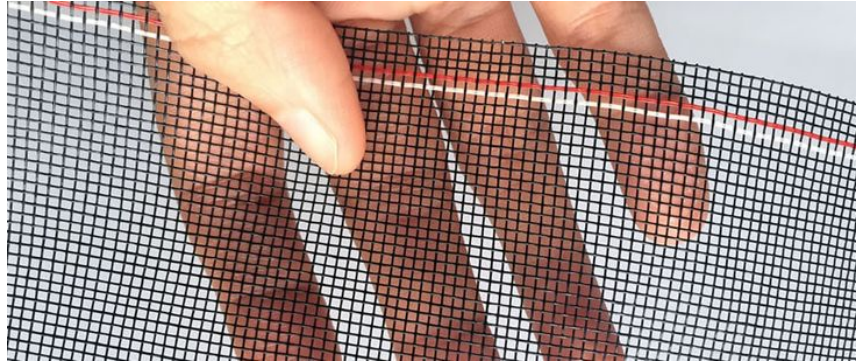
Finding a local source of rock dust

To find a local source of rock dust in your area, contact the rock quarry or sand and gravel companies in your area to find out what types of rock dust are available. You will be asking for the byproduct from the rock grinding process.



Ask for a geological description of the rock dust. You will find out whether it is glacial gravel, basalt, granite, andesite, etc.

Next, ask how fine the byproduct is and how much goes through a 200 mesh screen.



200 mesh screen

The particle measurement table shows the fineness with diameters in microns (thousandths, mm) and their corresponding sizes in the mesh (“mesh” is the number of holes in the filter per inch).

For a small garden plot you could use heavy lawn bags or 5 gallon buckets. For a farm you can use a pickup truck or have it delivered by the quarry.

There are millions of tons of aggregate materials and rock dust in the world and when you are not buying a commercial product for agriculture, it costs as little as \$0-8 per ton. Since most of the cost is included in the transportation, having your truck would be an advantage. A joint initiative with friends and neighbors will also reduce your costs. A pickup truck is ideal, but some quarries will deliver larger amounts such as 10-20 tons. The finer the grinding of the rock, the more accessible the minerals will be for the microorganisms. John Hamaker used the term “rock dust”, meaning “70-90% of which will pass through a 200-mesh filter.”

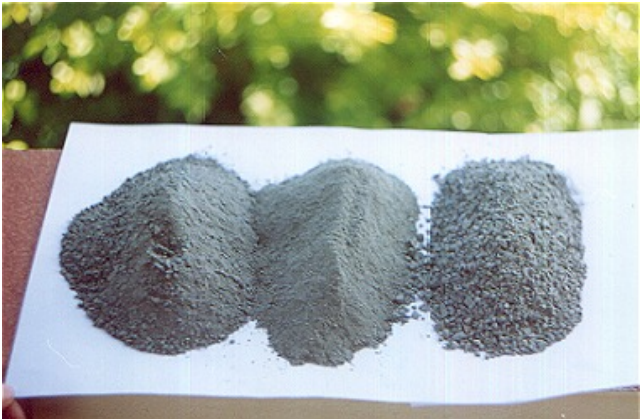
Particle Size Conversion		
Particle	Diameters (microns)	Mesh
Fine Sand	250-100	50-125
Very fine sand	100-50	125-250
Silt	50-2	250-6000
Clay	2 or less	6000 or more

How do quarries and gravel pits and the aggregate industry refer to rock dust?

It is called mineral fines, rock fines, waste, tailings with a caliber of less than 200 mesh (75 microns). The byproduct is often stored in ponds. Do not buy sand that is used to prepare concrete mixtures, abrasive sand, sand for filters, brick sand, because it is too coarse.

Which material is best?

According to Hamaker in the 1970s-90s, glacier materials were preferable because they contain a heterogeneous (diverse) combination of rocks and minerals.



Today, rocks of volcanic origin, such as basalt, rhyolites, etc. are very highly recommended, especially in tropical and subtropical regions. Most sedimentary rocks (limerock and dolomite) are used to balance soil acidity and make up for calcium and magnesium deficiency. Remineralization specifically refers to the hard silicate rock types.

Testing a local source of rock dust

Doing a Pot Test

A pot test will provide direct, practical evidence of what the product will do with soil. The idea is to mix rock dust with soil, put the soil in a clay pot and plant a radish or other fast-growing plant there and observe its growth. John Hamaker wrote: “This test is the most convincing argument. Everyone can do it. There is no delay - within 6 hours you can get a rapid growth of microorganisms. Having taken several clay pots 15 cm high, I filled them with mixtures of earth and peat per 50 to 50, and 3 tablespoons with a rock dust top. The results were amazing!”



You can compare different mixtures or samples of rock dust, depending on what is available in your area. For comparison, use several pots with soil without rock dust.

You can also start with small beds in the garden (mix rock dust with the topsoil) and compare the yield from these beds with the rest of the crop.

Test “Determination of Humidity”

Especially for a farmer using a local source, if the mixture is bought outdoors without protection such as a tarp, you may need to know the actual dry weight of rock dust in order to sufficiently fertilize the soil. Take a sample, weigh it, then completely dry in the oven and re-weigh. This test will show the percentage of moisture in the mixture. This will help to determine the application rate, because the rates recommended in our charts are dry.

Rock dust chemical analysis and mineral composition

Many quarries have a spectrographic analysis of the rock dust which allows you to see the parts per million of different minerals and trace elements.

Most farmers will be working with a soil analysis, when considering the rock dust to apply.

A grassroots approach

In most cases, Hamaker recommended that there was no need to do a laboratory chemical analysis of rock dust. A pot test and trial cultivation of fast-growing plants will provide more accurate information with less expense. In cases where there is

doubt as to the origin of the mixture, a laboratory test is necessary to ensure that it is free of radioactive elements and toxic industrial by-products. It is possible that the seller has already done such an analysis or has a product certificate. If not, then you can order special tests in independent laboratories.

Since John D. Hamaker and co-author Don Weaver published the book *The Survival of Civilization*, many strides have taken place to establish the scientific credibility for remineralization through research studies that have been conducted all over the world. In Brazil over the last 20 years, hundreds of studies have been published in the field of agrogeology and agroecology by EMBRAPA and the universities. Groundbreaking research from the Leverhulme Centre for Climate Change Mitigation was published in *Nature* in July 2020 showing the effectiveness of remineralization.