

POTASH SALTS

THEIR PRODUCTION AND USE

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LIKE any living creature, a plant needs food for its life and growth. Besides Nitrogen and Phosphoric Acid, Potash is one of the main plant food elements which is removed in considerable quantity from the soil by crops. If these removed quantities of plant nutrients are not replaced, the soil becomes exhausted and normal and satisfactory crops cannot be obtained. Starving plants are weak and unable to resist diseases, plant pests and adverse climatic conditions; moreover, they are not able to produce crops of good quality.

Potash is applied to crops in the form of Potash-salts. These are produced from natural Potash deposits which are found deep down in the earth in only a very few countries. The origin of these deposits dates back millions of years, when large areas of Europe were covered by sea. In the hot climate prevailing in that geological era, the water evaporated and the contained salts started precipitating successively according to their solubility thus accumulating gradually the huge Potash deposits. These Potash deposits were subsequently covered by the strata of succeeding geological periods and were thus buried at such a depth that they would not now be accessible for mining but for violent movements in the earth crust, which raised the strata.

Potash deposits were first discovered about 100 years ago near Stassfurth in Germany. They vary greatly in thickness, and sometimes the beds are flat and horizontal, and sometimes they are acutely folded due to severe distortions of the earth's crust. The salts have to be raised from a depth of as much as 3,000 feet or over half a mile, and each mine is allowed to have two shafts, from the bottom of which a system of galleries or tunnels lead to the places where the Potash ores are being mined. An elaborate system of ventilation is, of course, necessary to make it possible for the miners to work in the extreme heat at these great depths. Hundreds of miners work under conditions of extreme difficulty, deep in the bowels of the earth, so that Ceylon may receive its supplies of this essential fertilizer.

The Potash-bearing rock is drilled and blasted, and the ore is loaded by means of mechanical scrapers and automatic conveyors into mine cars which are sent racing along an underground railway to the bottom of the shaft; thence they are hoisted swiftly to the surface and are released down an incline into the ore refinery, where the boulders of rock are crushed, ground and washed to extract the salts, which are subsequently fractionally crystallized.

Some of the crude salts brought up from the mine contain sufficient pure Potash (K_2O) for them to be used as fertilizer without any additional treatment other than fine grinding. These are mostly used in places not too distant from the mine because their K_2O content is only around 12-15% and the freight per unit of pure Potash (K_2O) would be too high for shipment to distant places. It should always be remembered that it is the price per unit plant food content which decides the value of fertilizer and not the price per bag without consideration of its plant food or K_2O content.

In order to produce Potash fertilizer with a high plant food content and less "filler," it is necessary to process the crude salts in the refinery. In the very extensive surface plants attached

to the mines, the salts are brought into solution and separated by fractional crystallization from saturated solutions. After a long and complicated process, the precipitated and concentrated salts are dried in stages before they are stored in large store-houses or silos ready for shipment.

Raw salts (Kainit, with 12-15% pure Potash K_2O) is used in Germany for light, arable soils and grassland, but by far the largest proportion of Potash used in the world is applied in more concentrated form. In the 40-60% Potash fertilizers, the Potash is present as Potassium Chloride, and these Potash fertilizers are applied to general agricultural crops. For special conditions and for chlorine-sensitive crops the salts preferred are those containing Potash in the form of Potassium Sulphate :—

Sulphate of Potash 48-52% pure Potash, and
Sulphate of Potash Magnesia (Patent Kali) 26-30% pure Potash.

As the name signifies, Sulphate of Potash Magnesia contains, in addition to 26-30% K_2O , about 25% Sulphate of Magnesia. Sulphate salts are used primarily for starch-producing crops and where quality is the main consideration, for potatoes, fruits, vegetables, hops and tobacco.

The planter needs to know why Potash is so necessary for agriculture and why it is an indispensable element in plant life. In its leaves the plant produces, in the presence of chlorophyll, its own organic substances by utilizing, under the influence of sunlight, the water and carbon dioxide absorbed from the atmosphere. This process is possible only in presence of Potash and this element cannot be substituted by any other nutrient. For the full and unrestricted development of the plant this nutrient must be present in the soil in adequate quantity and in a readily-soluble form.

The Potash assists in the formation of the sugars, starches and proteins which are found in the sap and nut of the coconut palm, and it helps the movement of these organic compounds from the leaves through the plant to the nut. Potash influences the air and water economy of the plant and plants which are suffering from a deficiency of Potash suffer more severely during drought than healthy, well-fed plants. Potash also promotes root-growth so that the plant is able to absorb more plant food from the soil. It is the basis of vigorous and healthy growth as it strengthens the plant tissues and makes them more resistant to the attacks of pests and diseases. All these factors help towards increased yields of nuts per acre.

Assuming that a coconut palm bears 60 nuts per annum and drops 15 leaves, it has been calculated 60 palms would remove 125 lbs. of Potash per acre from the soil. This means that if the leaves, nuts and husk are all removed from the land, each palm will require at least 2 lbs. of Potash in addition to Nitrogen and Phosphorous to replace the losses in the soil.

No palm, even on the most fertile soils, can continue for long to bear full crops unless the plant food removed is systematically replaced. The beneficial effects of fertilizing on the colour, growth and productivity of coconut palms have been confirmed by the long-term experiments* at the Coconut Research Institute of Ceylon, which give striking evidence of the special need of this crop for Potash. The results obtained in these experiments are due to the fact that Ceylon soils are generally poor in available Potash and, consequently, are much in need of this fertilizer. The full effect of fertilizing becomes evident only by the third year; it cannot be expected, therefore, that long-neglected palms, will respond to fertilizing immediately. The increase in crops does not begin until after two years of fertilizer application because the vegetative parts must grow and become healthy and vigorous again before more flowers and nuts can be produced.

* These manurial plots may be seen on Bandirippuwa Estate, Lunuwila, at any time.