

Rocks for crops: Assessment of the Quality of Adigudom Gypsum for crop production in the northern highlands of Ethiopia

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Abstract :

Significant proportions of the landmasses of Ethiopia are covered by massive and continuous Rocky

Mountains of different geological origin and composition, which can be useful even for organic farming. In the last decade, in fight against the recurrent drought in the north Ethiopian State of Tigray more than 46 dams have been constructed with a cumulative storage capacity and irrigable area of 49.91 million m³ and 3115 ha, respectively. However, in the irrigated fields of these dams, salt minerals like thenardite (Na₂SO₄), halite (NaCl), zincobloedite (Na₂Zn(SO₄)₂·4H₂O), and anorthoclase (Na,K)(Si₃Al)O₈ have been observed recently, which can cause sodicity thereby crop productivity can be impaired gradually. A list of management options should be tabled urgently before the problem is aggravated. Large gypsum deposit was found in the localities of the irrigated fields. Thus, this study attempted to evaluate the quality of these minerals whether they can be useful for agricultural purposes. Analysis revealed that up to 150 cm of the profile depth of the rock was mainly composed of gypsum (95%) with the predominance of oxides of S (43.5-46.6% SO₃-2) and Ca (32.1-33.5% CaO). The oxides in the sampled rock followed the order of: SO₃-2 > CaO > SiO₂ > Al₂O₃ > Fe₂O₃ > MgO > Na₂O > K₂O > TiO₂ > MnO > P₂O₅ with the finest particle size (81.7-90%) dominating over other sizes. This study has come to the conclusion that Adigudom gypsum deposit can be used as rock for crops through enhancing sodicity management and sulphur nutrition. [Nature and Science

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Key Word :

Adigudom gypsum, agromineral, microdams, sodic soils, sulphur nutrition

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