

# Development of Soil Physicochemical Properties of Reclaimed Croplands in a Large Opencast Mining Area on the Loess Plateau<sup>1</sup>

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**Abstract:** In this study, we collected soils from 11 plots of the reclaimed cropland at a large-scale opencast coal mining area, analyzed their profile properties, and compared these properties with the properties of undamaged croplands and un-reclaimed lands. These properties were compared using comparative analysis, variance analysis, correlation analysis, and principal component analysis to reveal the underlying rules of variation with reclamation years. The results indicate that the soil profile properties of the reclaimed cropland vary significantly with differences in depth, particularly at depths of 30 cm, 40 cm, and 50 cm. In addition to soil organic matter and soil total potassium, the most significant differences among the three types of croplands are soil fertility followed by soil physical indicators. There are positive correlations between soil bulk density and soil pH ( $p < 0.01$ ), between soil field moisture capacity and total phosphorus ( $p < 0.05$ ), between soil organic matter and total nitrogen ( $p < 0.01$ ), between soil organic matter and soil available potassium ( $p < 0.01$ ) and between soil organic matter and soil total phosphorus ( $p < 0.01$ ). The primary factors affecting the properties of soil in reclamation croplands are soil physical and chemical indicators for those croplands that have been reclaimed for 2 years and organic matter and soil nutrients for those croplands that have been reclaimed for 13 years and 18 years, as well as undamaged cropland. The distribution of the physical soil profile and chemical properties of the croplands that have been reclaimed for 13 and 18 years are highly consistent with the properties of the undamaged croplands.

Additional Key Words: land reclamation; soil reconstruction; soil quality

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1. Oral paper presented at the 2018 National Meeting of the American Society of Mining and Reclamation, St. Louis, MO: The Gateway to Land Reclamation, June 3-7, 2018. Published by ASMR; 1305 Weathervane Dr., Champaign, IL 61821.
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