

Interactive comment on “Spatial variability of some soil properties in west coastal area of India having oil palm (*Elaeis guineensis* Jacq.) plantations” by Sanjib K. Behera et al.

Sanjib K. Behera et al.

sanjibkumarbehera123@gmail.com

Received and published: 20 February 2016

Dear Sir, We have gone through the comments referee # 2. We are hereby submitting our point wise response to the comments.

Comment: The manuscript “Spatial variability of some soil properties in west coastal area of India having oil palm (*Elaeis guineensis* Jacq.) plantations”, by Behera et al., cannot deserve publication in Solid Earth. I started to read the paper with great interest, although the style was a bit confused. However, when in the Materials and Methods I found that the spatial variability of tested soil properties were studied based on samples distance on average 5-7 km, I stopped to review the manuscript. The study objectives could not be achieved on proper way in practice with present sampling scheme.

C1

Response: Spatial variability of soil properties and soil nutrients have been studied globally by various researchers at field, catchment as well as regional scales and enough literature is available in this regard. In the present study, we have assessed the spatial variability of soil properties at regional level. We have collected soil samples of oil palm plantations of the region i.e. Goa state of India (a small state having two districts only). Selection the oil palm plantations were done randomly based on soil types and adoption of crop management practices to capture the spatial variability of soil properties of the area.

Comment: Given results by this study do not report interesting information which can be of interest for decision makers, and practitioners. The authors should know that “real producers” cannot make decision for variable rate fertilization according to one sample on area of approximately 50-70 ha.

Response: We beg to differ with the referee that the results do not report interesting information. This information is very useful for policy and decision makers for planning fertilizer supply and management at regional scale but not for the real producers to make decision on variable rate of fertilizer application at each plantation level. In many countries across the world including India, there is an acute shortage of fertilizers to meet the crop demands. Rational and judicious distribution and use of fertilizer is of paramount importance under such conditions. With the help of interpolated maps, planners and policy makers would be able to take correct decisions on appropriate fertilizer distribution strategy.

Comment: The authors should be skilled enough in soil science to know the quite large variability of soils and any soil property as consequence of soil forming factors as well as extrinsic factor like fertilization. Collecting and analysing samples on large scale for variable fertilizer application is almost “ridiculous” to account for any kind of soil feature and its variation because of disturbances.

Response: We do agree with the referee that large variability of soil properties exist as

C2

a result of soil forming factors and due to fertilizer application. In our present work, we exactly study the same at a regional scale.

Comment: This statement is supported with “poor” semivariogram model parameters. Based on the information’s from Table 3 significant number of properties almost looks like a pure nugget. Spatial dependence is weak, while ranges do not cover even used sampling scheme in this investigation. Although authors did not provide semivariogram visualisation it is noticeable from their properties that sampling scheme is inappropriate. Thus kriged maps are useless for producers and show a huge uniform area for fertilizer application.

Response: We agree with the referee that some soil properties are having weak spatial dependency. However, some soil properties are also having medium and strong spatial dependency. Hence, we hereby reiterate that this study was carried out to study spatial variability of soil properties at regional scale as mentioned earlier.

Comment: This uniformity is especially pronounced in phosphorus, potassium and pH maps as properties that are most widely used for application of variable rate technology. According to maps of studied properties there is no need for any in-field variable application of inputs.

Response: As we mentioned earlier, these maps are of use for the decision makers to decide fertilizer distribution strategies.

Comment: I have to also underline that the authors did provide insufficient information about sampling. Are these samples representing one sample or a composite sample from lot of individual samples? Of how many individual samples consist on sample? What area covers one composite sample? In summary authors mentioned that samples are collected from each plantation. If so, why authors did use geostatistics? Then it is clear that you use composite sample from whole plantation. Nevertheless, the real preclusive fault is the first one I mentioned.

C3

Response: In the present study, representative single soil samples were collected from oil palm plantations selected on the basis of soil types and adoption of crop management practices. Then spatial variability of soil properties was assessed using geostatistics.

Interactive comment on Solid Earth Discuss., doi:10.5194/se-2016-9, 2016.

C4