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Digital Mapping of Togo's Soil Fertility: Savannah Region

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Abstract:

A soil assessment was carried out in the savannah region of Togo in 2018, aiming at drawing the digital map of Togo's soil fertility and making fertilizer recommendations. Soil samples were taken from geo-referenced GPS points and were analyzed for parameters such as water pH, Organic matter, available phosphorus and exchangeable potassium. Thematic maps have been drawn using an ArcGIS package. The results showed that the soils of the Savannah region in Togo are mainly (84%) not very acidic (pH = 5.5 to 6.5), overall poor to very poor (84%) in organic matter (<2% OM), essentially poor to very poor (86%) in available phosphorus (<15 mg/kg of soil) and mostly very poor (87%) in exchangeable potassium (<90 mg / kg of soil). These results allowed the agricultural research institute of Togo to make fertilizer use recommendations and to develop, in partnership with Morocco, a digital platform (fertitogo.tg) for decision making in crop fertilization.

Methods

- Networking of agricultural areas in the Savannah region (Fig. 1)
- Soil sampling (Photo 1)
- Soil analysis
- Data registration in Excel
- Digital mapping with ArcGIS
- 10.4
- Recommendations

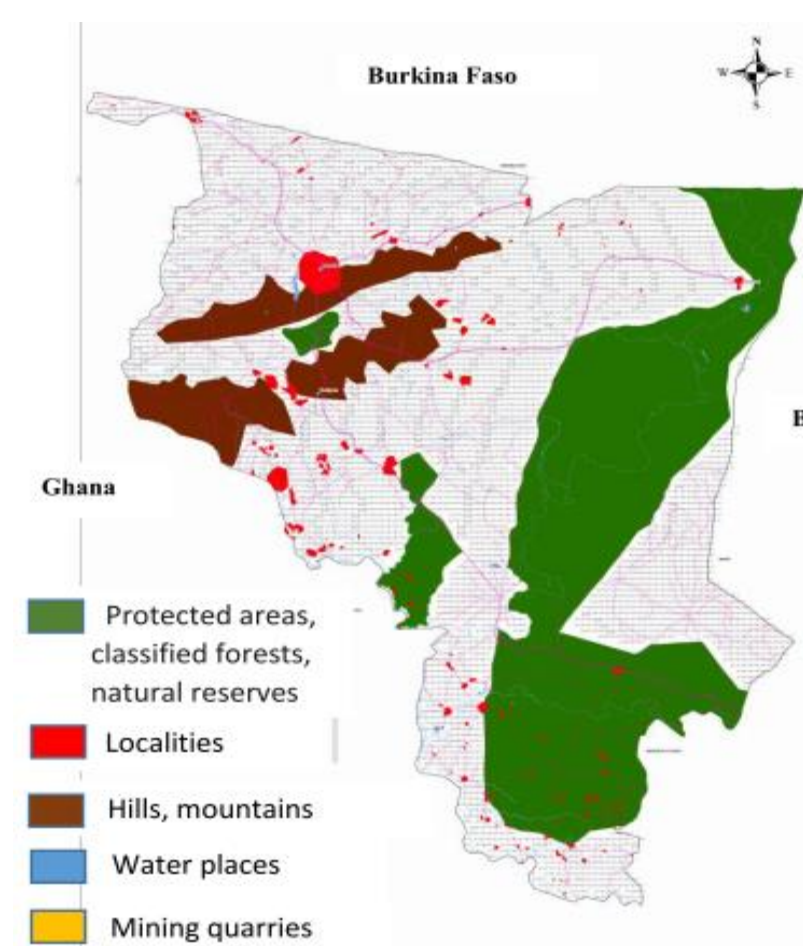


Fig.1: Network of Savannah region (ESA/UL, 2017)



Photo.1: Soil sampling)

Results

1. Water pH

- Water pH digital map of the Savannah region (Fig. 2)
- 84 % not very acidic (5.5 – 6.5)
- Favorable to plant nutrition

Recommendation

Choose appropriate manure and fertilizer to avoid pronounced acidification

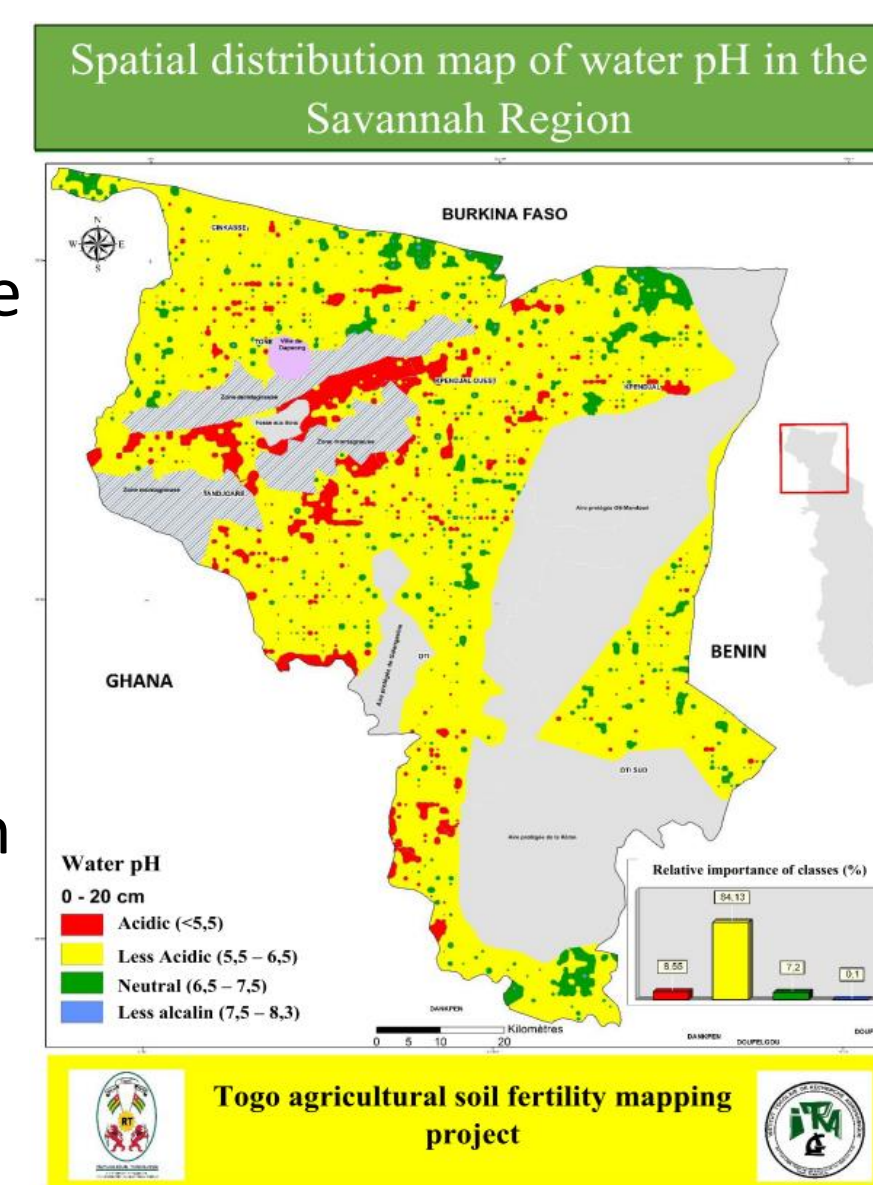


Fig.2: Savannah region pH map (ITRA, 2019, translation added)

2. Organic matter

- Organic matter digital map of the Savannah region (Fig. 3)
- 84 % poor to very poor (<2%)

Recommendation

Organic amendments (compost) to improve water retention, structure of soils and better use of mineral fertilizers.

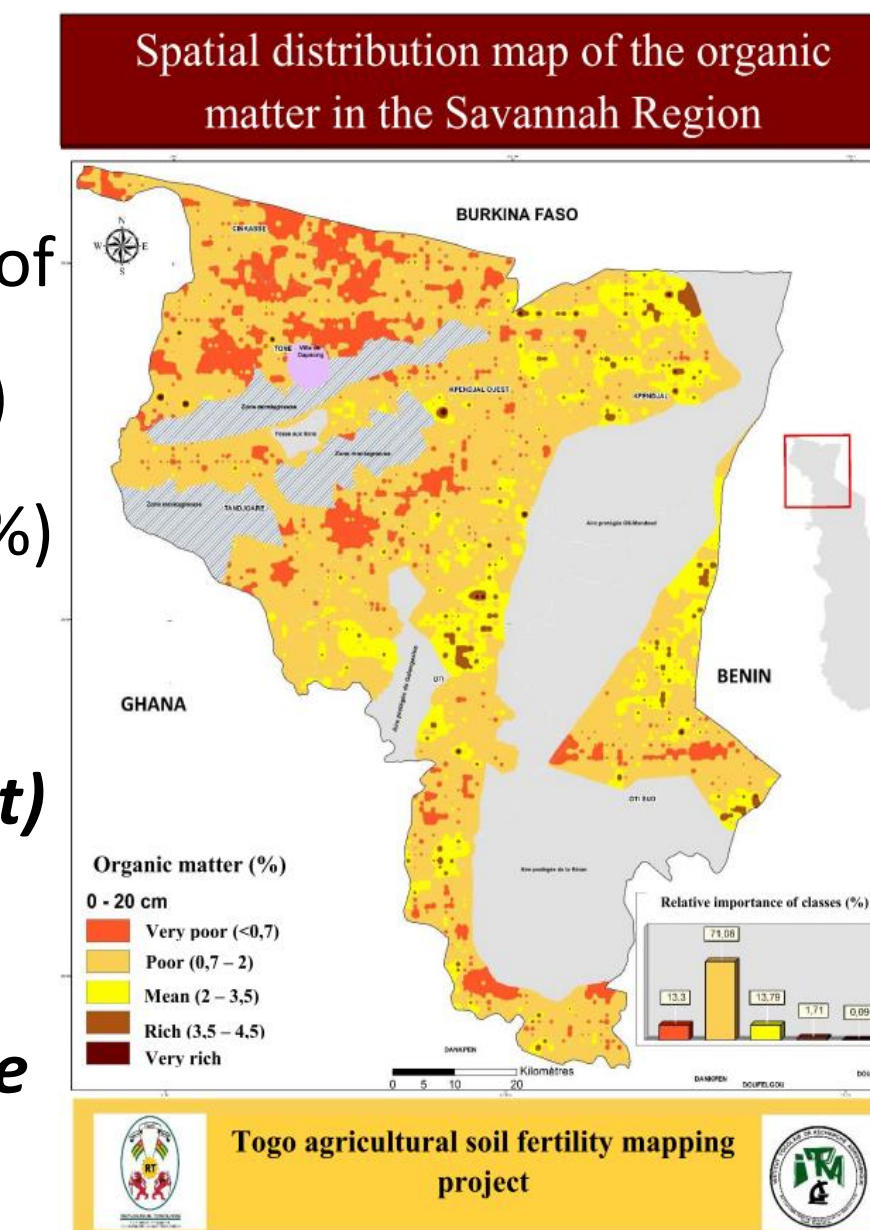


Fig.3: Savannah region organic matter map (ITRA, 2019, translation added)

Acknowledgements



3. Phosphorus

- Phosphorus digital map of the Savannah region (Fig. 4)
- 86 % poor to very poor (<15 mg/kg of soil)

Recommendation

Correct the level of phosphorus by adding compost rich in P (biochar) and phosphate fertilizers.

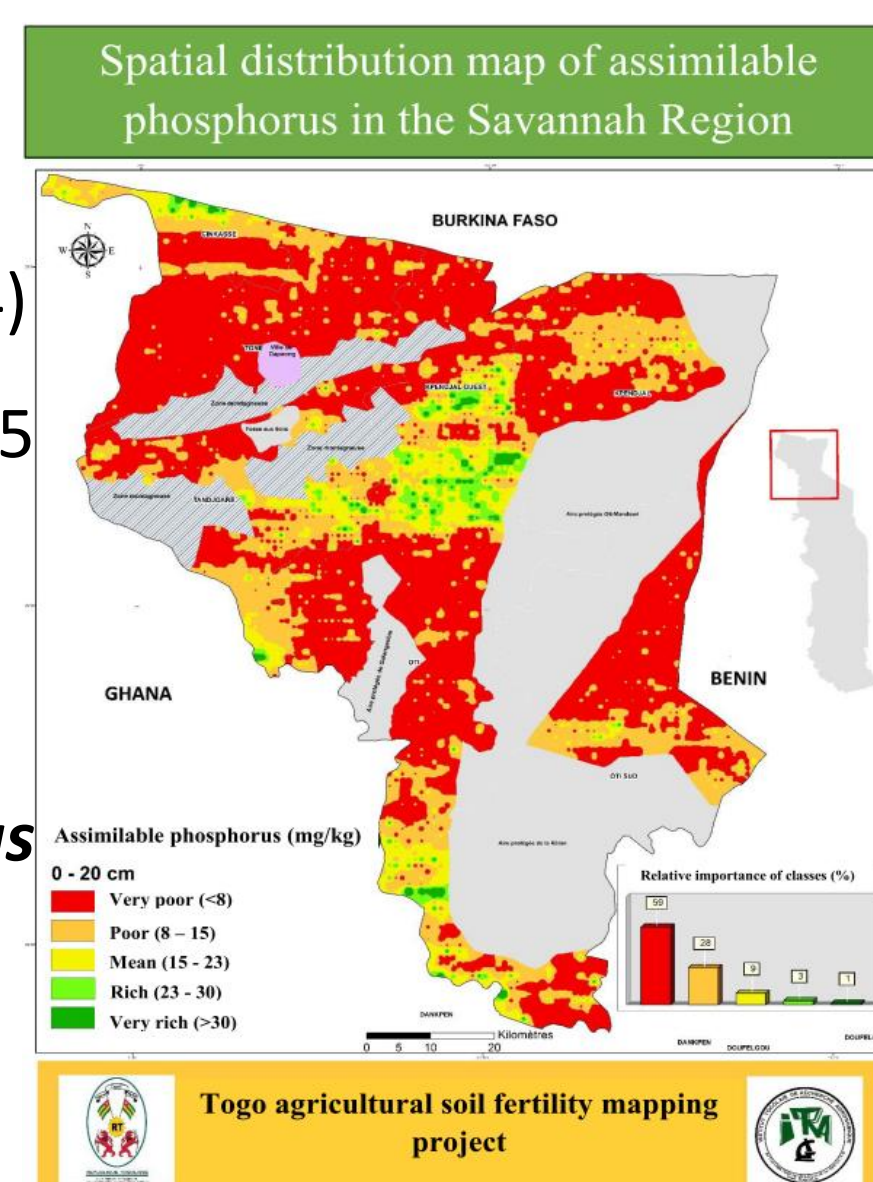


Fig.4: Savannah region phosphorus map (ITRA, 2019, translation added)

4. Potassium

- Potassium digital map of the Savannah region (Fig. 5)
- 87 % very poor (<90 mg/kg of soil)

Recommendation

Correct the level of potassium by adding compost rich in K (organic fertilizers) and mineral fertilizers rich in potassium.

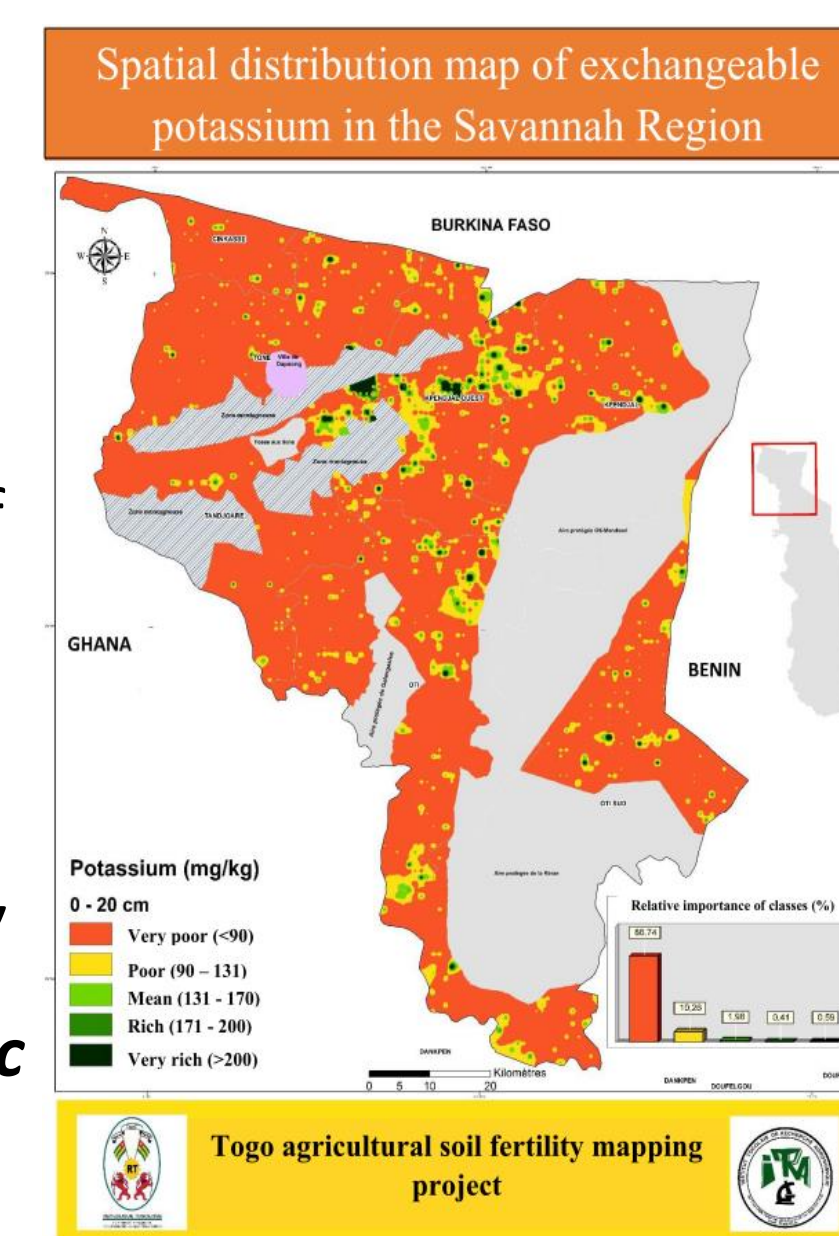


Fig.5: Savannah region Potassium map (ITRA, 2019, translation added)

Conclusion

- 4 digital soil fertility maps (pH, OM, P, K) developed
- Soil fertility level very low in the savannah region
- Recommendations given to improve soil fertility
- Promote the techniques of Integrated Soil Fertility Management (ISFM) to ensure sustainable productivity
- Platform fertitogo.tg developed

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