STATUS OF SALT -AFFECTED SOILS IN SUDAN

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INTRODCTION

- Sudan, one of the large countries in Africa, has an area of approximately1.86 million km^2. Its climate is diverse, ranging from tropical humid in the south to desert in the north.
- Studies on climatic changes show a considerable decrease in annual rainfall and this, combined with human misuse of natural resources, water scarcity and removal of vegetation cover, necessarily implies a deterioration in soil properties.
- In many areas of the world, the presence of salts in arid and semi-arid zones is widespread and Sudan is no exception.
- High evapo-transpiration, physical weathering under low rainfall coupled with low humidity and high temperatures, all are conditions can result in high contents of soluble salts and/or sodium salts (SAS).
- The most commonly salts found in Sudan are sodium chloride (NaCl) and sodium sulphates (Na_2SO_4) (Gabir, 1986; Buraymah, 1998; Lahmeyer, 2005).

GENERAL OVERVIEW OF SAS IN SUDAN

- Salt-affected soils in Sudan fall under three soils orders:

  Vertisols, Aridisols and Entisols (USDA, 1999).

- The system used for assessing the salt-affected soils in Sudan is based on the system developed by the USDA (Table1), where soils were categorized into four groups:

Table 1: Characteristics of salt-affected soils.

Soil property	Unit		Type of salt-affected soil		
		Non-saline	Saline	Saline-Sodic	Sodic
Electrical conductivity (ECe)	**dSm^{-1}**	**< 4**	**> 4**	**> 4**	**< 4**
Exchangeable sodium percentage (ESP)	**%**	**< 15**	**< 15**	**> 15**	**> 15**
pH	**-**	**< 8.5**	**< 8.5**	**< 8.5**	**>8.5**
Sodium adsorption ratio (SAR)	**-**	**< 13**	**< 13**	**>13**	**>13**

GENERAL OVERVIEW OF SAS IN SUDAN

- Salt-affected soils extend along vast areas from latitude 14–22° N including White Nile, Gezira, Khartoum, the river Nile and the northern states with the total estimated area of 2061840 ha.
- The land classification system adopted in Sudan by the Land and Water Research Centre (Kevie and Eltom, 2004) incorporated the findings that ESP values of up to 35 in the topsoil and 50 in the subsoil are accepted for the potential rating of the soil as marginally suitable land in Gezira soil and other soils in Sudan.
- The system adopted used the following values for salinity and/or sodicity assessment (Tables 2 and 3):

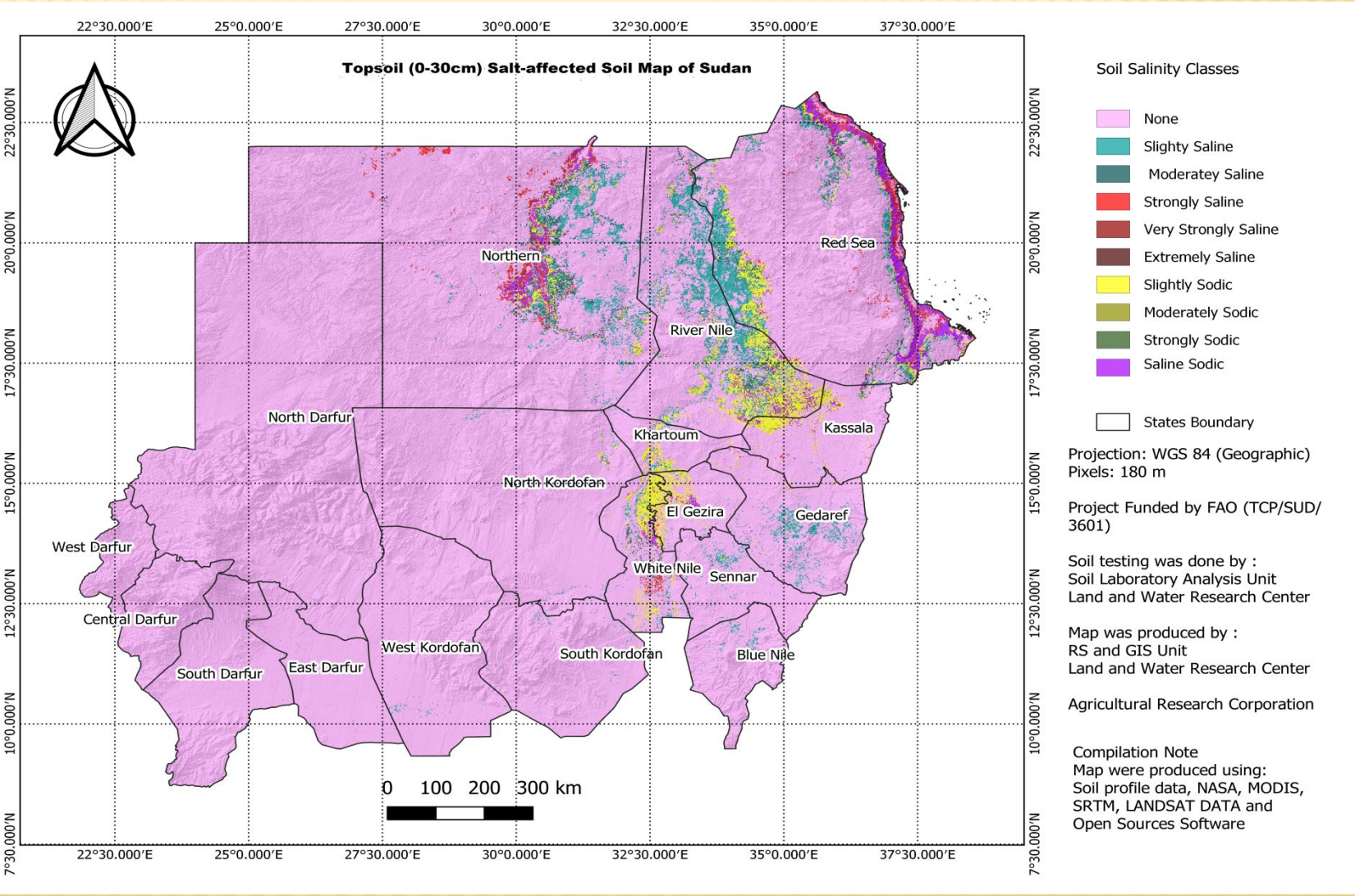
Table 2: Salinity rating for for current land suitability

Rating	ECe (0–30 cm)		ECe (30–120 cm)	
	NaCl	Na_2SO_4	NaCl	Na_2SO_4
1	<4	<5	<6	<8
2	4–8	5–10	6–12	8–15
3	8–16	10–16	12–24	15–24
4	>16	>16	>24	>24

Table 3: Sodicity rating for current land suitability

Rating	ESP (0–30 cm)	ESP (30–90 cm)	SAR (0–30 cm)	SAR (30–90 cm)	Texture
1	<10	<20	<8	<18	All textures
2	10–20	20–35	8–18	8–38	Clayey soils
3	20–35	35–50	18–38	38–68	"
4	>35	>50	>38	>68	"

MAP OF SALT-AFFECTED SOILS OF SUDAN



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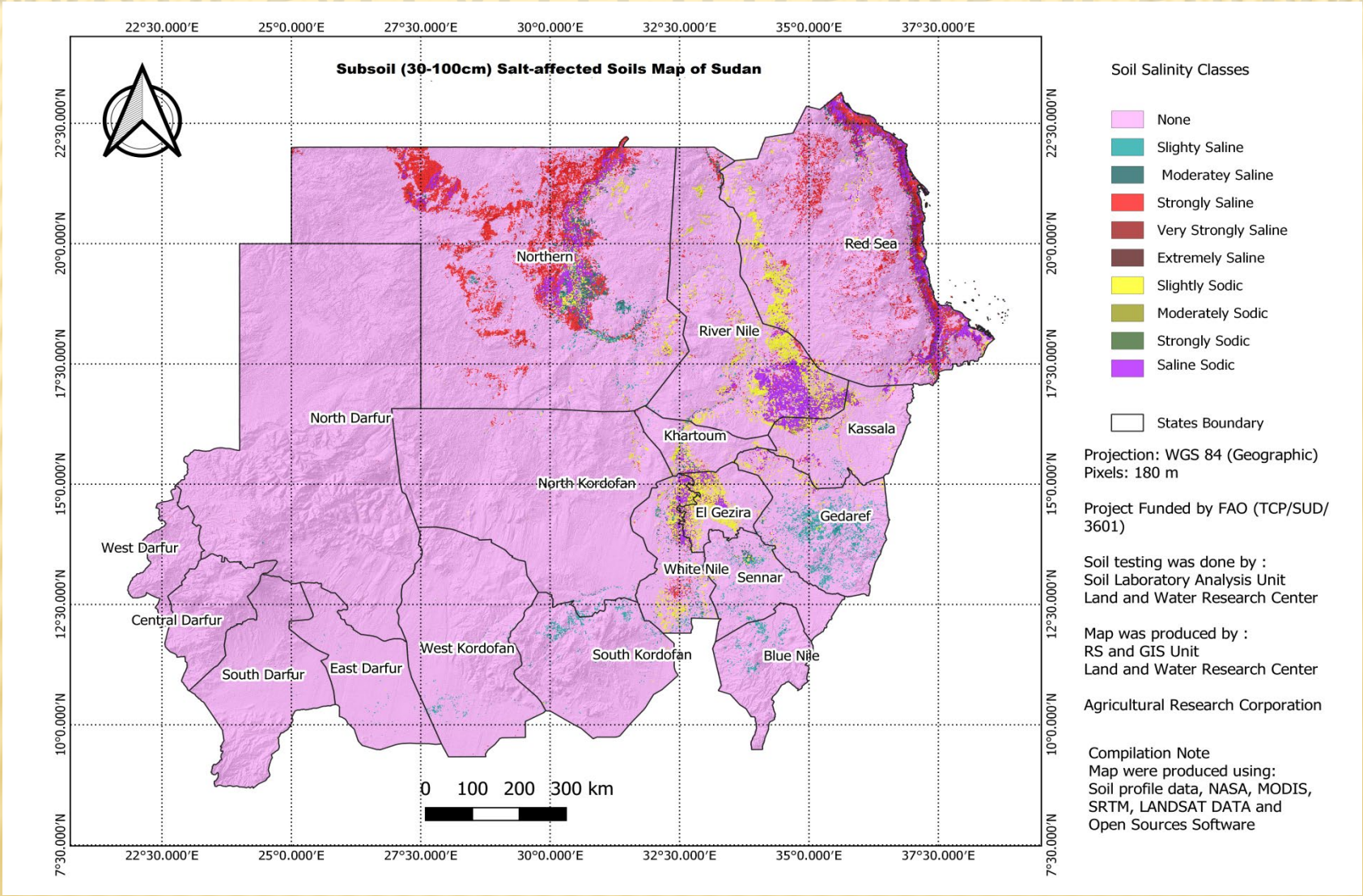

POTENTIALITIES IN REHABILITATION OF SAS IN SUDAN

- Based on the research work that done by different stakeholders, the fallowing practices can be applied:
- For the Northern region(River Nile and Northern state), the reclamation through leaching is the common practice as the soils are lighter in texture.
- For the Khartoum and Gezira and White Nile areas, addition of amendments and leaching are applied with the construction with drainage system as the soils are heavy textured soils.
- Breeding for salt tolerant crops is another option that can be adopted especially in North Sudan as many newly established schemes are underway besides the soils are more saline and susceptible to salinity and/or sodicity.
- Selection of low salt index fertilizers and correct distribution of them.

Thanks