Detailed Soil Survey of Settlers' Villages in Umarkote Region of Dandakaranya Project.

District: Koraput : : State: Orissa.

I. INTRODUCTION.

During recent years, the Government of India has rehabilitated a number of refugee families from East Pakisthan in the different zones of the Dandakaranya Project covering the States of Orissa and Madhya Pradesh. The land, once covered with dense and valuable forests, has now been converted into settlement colonies and agricultural lands. Before releasing the land for settlement, advance soil surveys are conducted by the Dandakaranya Project staff to demarkate the land fit for clearance. Soils having a minimum depth of 18 inches and slope gradients less than 5 percent are the guiding factors for this purpose. When the land is cleared of vegetation, field plots are laid and contour bunds constructed.

The Dandakaranya Project Administration is keen on evolving a suitable cropping pattern for the different regions where the families are now settled. In this connection a request was received from the Chief Administrator, Dandakaranya Project to take up detailed soil surveys in the Umarkote and Paralkote regions. Field work in the Umarkote region was started in October 1963 and completed in January 1964. This report describes the soil survey and land use of the 24 Settlers' Villages of Umarkote region in Koraput district, Orissa State (see figure 1).

II. GENERAL DESCRIPTION OF THE AREA:

1. Location and Extent: For administrative convenience, the project area of operation has been divided into four zones viz Umarkote- Raighar and Malkangiri zones in Koraput district of Orissa and Pharasgaon and Paralkote zones in the Bastar district of Madhya Pradesh, each zone having its own headquarters (figure 2). In Umarkote - Raigarh zone, 48 Settler Villages have been set up in which 2854 families have been resettled. Of these villages, 24 villages are located in each of the two areas of the zone - the Umarkote area and the Raigarh area. The headquarters of the zone is located at Umarkote town.

Umarkote is situated about 80 miles north west of Koraput and the area surveyed falls within a radius of about 20 miles round about Umarkote town between the north latitudes $82^{\circ}0'$ -$82^{\circ}25'$ and east longitudes $19^{\circ}33'$ -$19^{\circ}44'$ covering an area of about 9592.07 acres.

V. DESCRIPTIONS OF THE SOILS IDENTIFIED IN UMARKOTE REGION.

During the course of the detailed soil survey of Umarkote region, four soil series have been identified, described and mapped. Each series differs from the other in certain morphological and other characteristics that ultimately affects its suitability for agriculture and soil management. The various soil series along with type, depth of soil, slope and erosion classes have been delineated on the soil and land capability mapsappended with the report. The areas of the mapping units and the capability classes and sub classes under which they are classified are given under the respective soil series. The descriptions of the soil series are given below. The analytical data is given in appendix I and soil map legend in appendix II.

Purla series: (Prl)

The Purla series consists of brown to dark brown soils derived from granite gneisses rocks associated with ferruginous quartzite in the sub-tropical parts of Koraput and Bastar districts of Orissa and Madhya Pradesh respectively. Moderately deep to very deep, excessive to moderately well drained, sandy loam to sandy clay loam soils occurring on level to gently sloping lands; they have a fairly thick A horizon underlain by B which gets heavier with depth. The ferruginous gravel occurs generally below 30 to 40 inches. The sub-soil is also characterised by mottlings of yellowish red and strong brown colour. Geographically associated soils are the Chatiguda series.

Chatiguda series: (Cgd)

The Chatiguda series consists of dark brown to dark gray brown soils derived from granite gneisses and Diorites in the wet subtropical parts of Koraput and Bastar districts of Orissa and Madhya Pradesh respectively. Deep to very deep moderately well drained, sandy clay loam to clay loam soils occurring on level to gently sloping lands; they have 7 to 9 inches thick A horizon underlain by a thick B horizon 20 to 35 inches thick. The ferruginous gravel occurs below 40 inches. The yellowish brown sub-soil contains mottlings of varigated colours. Geographically associated soils are the Purla series.

Gobri series: (Gbr)

The Gobri series consists of very dark gray to dark gray brown soils derived from the chlorite schists in the wet subtropical parts of Koraput and Bastar districts of Orissa and Madhya Pradesh respectively. The parent material specially in valleys is quite deep and cannot be easily seen. Very deep, moderately well drained to poorly drained clay laom to clayey soils occurring on level to gently sloping lands; they have a thick Ap horizon grading to B1 and B2 horizons where the clay content increases with depth. Geographically associated soils are the Chatiguda and Mahuli series.

Mahuli series: (Mhl)

The Mahuli series consists of pale olive to light olive brown soils derived from Talc chlorite schists and confined to certain parts of Koraput district in Orissa. Very deep sandy clay loam to clay loam soils occurring on very gently sloping to gently sloping lands. The sub-soil is heavy with a strong coarse sub-angular blocky structure. Occasionally a few lime concretions are also present. Geographically associated soils are the Purla and Chatiguda series.

VI. LAND CAPABILITY CLASSES AND RECOMMENDATIONS FOR BETTER LAND USE AND CROPPING PATTERN.

Capability grouping is a system of interpretation to show the relative suitability of soils for crops, grazing, forestry and wild life. It is a practical grouping based on the needs, limitations and risks of damage to the soils and also their response to management. The land capability class is identified by Roman numerals. There are eight classes. All the soils in one class have limitations and management problems of about the same degree but of different kinds as shown by the sub-classes*. All the land classes except class I may have one or more sub-classes. * e(erosion) and w (drainage)

In classes, I,II and III are soils that are suitable for annual or periodic cultivation of annual or short duration crops. In class IV are soils that should be cultivated occasionally or only under careful management. In class V, VI and VII are soils that normally should not be cultivated for annual or short duration crops but they can be used for pasture and range as forest land or wild life. In class VII are soils that have practically no agricultural use. Class VIII lands have value as watersheds, wild life habitats or scenery. In the land capability maps of the Settlers' villages surveyed in Umarkote region, classes IIe, IIw, IIew, IIIe, IIIw, IIIew, and IVe are indicated.

Class IIe: Comprises 3283.46 acres or nearly 34 percent of the surveyed area. It consists of level to very gently sloping land with deep to very deep light textured sandy loam soils of Purla series, slightly eroded. The limitation is susceptibility to moderate sheet erosion. Although fields have been contour bunded, individual field bunding and levelling followed by proper management practices is essential. Land is not fit for paddy cultivation. Moisture retention is poor and even with a heavy intensity of rainfall water does not stand in the fields. In place of paddy other crops like groundnut, maize, arhar, tobacco, and niger can be grown. Potato also can be taken up in these soils. Application of farm yard manure at the rate of 5-10 cart loads per acre and preparation of compost with the available resources should be popularised.

Class IIw: Comprises 2394.93 acres or nearly 25 percent of the surveyed area. It consists of level to very gently sloping land with deep to very deep sandy clay loam to clayey soils of Purla, Chatiguda, Gobri and Mahuli series, slightly eroded. The limitation is drainage. Fields have been contour bunded. Although the top soil in Purla series is of sandy clay loam texture, water gets excessively drained and does not stand in the fields. But with individual field bunding, levelling and application of organic and green manuring, paddy can be cultivated. Although the soils of Chatiguda, Gobri and Mahuli series are moderately well drained to poorly drained, they are fit for paddy cultivation. When irrigation facilities are provided from Umarkote dam banana and sugarcane crops are recommended for Chatiguda and Mahuli series having sandy clay loam to clay loam texture. Green manuring plants like glyricedia, dhiancha and sesbania species should be intorduced on the bunds and the leaves can be used for green manuring paddy crop. Application of suitable fertilizer mixture with 30 lb N, 40 lb P_2O_5 and 30 lb of K_2O should be encouraged wherever possible.

Class II ew: 1826.28 acres of land are classified under class IIew i.e. 19 percent of the total area. This consists of very gently sloping land with deep sandy clay loam soils of Purla and Chatiguda series slightly eroded. The limitations are erosion and drainage. Fields have been contour bunded. Deep ploughing up to a depth of 8 to 12 inches should be tried in the soils of Purla series which is likely to increase the moisture retentivity of the soils. By levelling, field bunding, proper maintainance of bunds and application of organic and green manuring, Paddy can be recommended. These soils respond well to the application of Nitrogen fertilisers as observed by the experiments carried out by the Agricultural Department of Dandakaranya Project. Liberal doses of nitrogen fertilisers are recommended in addition to the application of farm yard manure or compost. Growing of green manuring plants on the bunds like Dhaincha, Glyricedia, and Sesbania species should be popularised. Fertilizer mixture as stated above is recommended to these soils, also. Japanese method of paddy cultivation can also be tried.

Class IIIe: This class comprising 60.96 acres consists of very gently sloping to gently sloping land with deep sandy loam soils of Purla series, slight to moderately eroded. The limitation is moderate susceptibility to erosion. Fields have been contour bunded. Such lands are recommended for groundnut, mestha, amhar, til, maize and niger. Horticultural crops like guava, mango, papaya can be grown on a samll scale. Application of farm yard manure or compost at the rate of 5 to 10 cart loads is desirable.

ClassIIIw: About 103.58 acres classified under IIIw consists of gently sloping land with very deep sandy clay loam to clayey soils of Chatiguda series, slightly eroded. The limitation is drainage. Fields have been contour bunded. With individual field bunding, levelling and application of organic manures and green manuring, paddy can be cultivated. Growing of green manuring plants like glyricedia, dhiancha and sesbania species on the bunds should be popularised. The leaves can be used for green manuring paddy crop. Fertilizer mixture in the ratio of 30:40:30 lbs/* acre is also recommended.
* N, P_2O_5 and K_2O respectively per

Class IIIew: 1716.52 acres of land or nearly 18 percent of the area which includes level to gently sloping land with moderately deep to deep sandy clay loam to clay loam soils of Purla, Chatiguda and Gobri series, slightly to moderately eroded are shown under this class. The limitations are susceptibility to erosion and drainage difficulties. Fields have been contour bunded. The moderately deep soils of Purla and Chatiguda series having clay loam texture on 1 to 3 percent slopes are recommended for crops like, mestha, jute, Bengal gram, green gram and black gram. The rest are recommended for paddy crop with proper management practices like levelling, field bunding, proper maintance of bunds and application of organic and green manures.

Class IVe: Class IVe comprising 206.34 acres includes level to gently sloping land with shallow sandy clay loam to gravelly sandy clay loam soils of Purla and Chatiguda series, severely eroded. The limitation is severe susceptibility to erosion. Cultivation of pulses like black gram, green gram, Bengal gram and oil seed crop like niger is recommended with suitable soil management practices. These soils are not fit for paddy.