

Proposed by:
 F.R. Moormann et al., 1966
 Revised by:
 1. N. Chorphaka, 1987
 2. P. Wiwatwongwana, 2004

CHIANG KHAN SERIES

Field Symbol: Ch

Distribution: Occupies moderate extent in the Central Highlands and the North.

Setting: Chiang Khan soils are formed from residuum and local colluvium derived from shale and metamorphic rock equivalent to shale and occur on erosion surface and footslopes. Relief is undulating to hilly which slopes range from 4 to 20 percent. The climate is Tropical Savanna (Koppen 'Aw'). The average annual precipitation varies from 1,100 to 1,300 mm. The mean temperature is from 26 to 28 °C.

Drainage, Permeability and Runoff: Well drained. Permeability and runoff are rapid.

Vegetation and Land Use: Originally mixed deciduous forest. Parts are cleared for shifting cultivation such as corn, cotton and also used as road building material.

Characteristic Profile Features: Chiang Khan series is a member of the clayey-skeletal, kaolinitic, isohyperthermic Typic Kandiuults. They are deep gravelly soils and are characterized by a dark brown or dark reddish brown gravelly loam or gravelly clay loam A horizon overlying a reddish brown or yellowish red grading to red very gravelly clay loam or very gravelly clay argillic B horizon. The reddish, yellowish and/or brownish mottles occur in the weathering zone, particularly in lower B horizon. Reaction is medium to neutral over strongly acid to very strongly acid.

Typifying Pedon: Profile code no. is NE-N-25/38 (moist color unless otherwise stated).

Location: Ban Na Bon, Tambon Na Ngiu, Amphoe Sang Khom Changwat Nong Khai.

Sheet Name: Ban Huai Khop

Sheet No.: 5445 III

Coordinate: 972987

Elevation: 270 m (MSL)

Relief: undulating

Slope: 5-6 %

Physiography: erosion surface

Parent material: residuum from shale

Drainage: well drained

Permeability: rapid

Runoff: rapid

Ground water depth: 2.7 m

Flooding depth: -

Duration: -

Frequency: -

Annual rainfall: 1,610.2 mm

Mean temp.: 26.3 °C

Climate type: Tropical Savannah (Aw)

Natural vegetation or land use: upland rice

Described by: Chalerm & Staff

Date: 26 May, 1981

Revised by: Phusit Wiwatwongwana

Date: 22 May, 2004

| Horizon | Depth (cm) | Description |
|---------|------------|---|
| Ac | 0-5 | Brown to dark brown (7.5YR4/4) gravelly clay loam; weak fine and medium granular structure; friable, slightly sticky, slightly plastic; many fine and few medium roots; gravels composed of laterite and some quartz diameter 2-3 mm about 25-35% of soil matrix; medium acid (field pH 6.0); gradual, smooth boundary. |
| ABc | 5-14 | Strong brown (7.5YR4/6) very gravelly clay loam; weak to moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few medium and one large roots; gravels composed of pseudolaterite 40-60% of soil matrix; strongly acid (field pH 5.5); mostly gradual, smooth boundary. |
| Btc1 | 14-35 | Yellowish red (5YR4/6) very gravelly clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; patchy thin clay coating on |

| | | |
|------|---------|--|
| | | ped and gravel faces; common medium roots; gravels mostly composed of pseudolaterite about 40-60% of soil matrix; strongly acid (field pH 5.5) gradual, smooth boundary. |
| Btc2 | 35-71 | Yellowish red (5YR4/6) gravelly clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; moderately thick clay coating on gravels faces; common medium roots; gravels composed of pseudolaterite and quartz; strongly acid (field pH 5.5); clear, smooth boundary. |
| Btc3 | 71-115+ | Mixed, red (2.5YR5/8) strong brown (7.5YR5/8) yellowish brown (10YR7/6) gravelly clay; moderate medium subangular blocky structure; firm, sticky, plastic; moderate thick clay coating on ped faces; strongly acid (field pH 5.5). |

Type Location:

The Chiang Khan series was named for Amphoe Chiang Khan, Changwat Loei, in which soils of this series were first described.

Rang of Profile Features:

The thickness of an A or Ap horizon varies from 10 to 30 cm and has 7.5YR or 5YR hues, values of 3 or 4 and chromas of 2 to 4. This horizon may be free of gravels. Structure is moderate fine and medium blocky at the lower part of horizon. Field pH values vary from 5.5 to 7.0.

The B horizon has 2.5YR or 5YR hues, values of 4 to 5 and chromas of 3 to 8 and has distinct clay coatings on ped faces and on gravel faces, coarse fraction may include ironstone, pseudolaterite and quartz gravels. Structure is moderate fine to medium blocky. Field pH values vary from 4.5 to 5.5.

The C or R horizon occur at some depth below 150 cm and mainly consist of fragments of shale and quartzite. The gray clay with a multicolored mottles which may be considered as a plinthite layer occur in places in very deep subsoil.

Similar Soils Series:

Klong Chak series (Kc): has udic moisture regimes and redder color in the subsoil.

Krabin (Kb): has browner color in the subsoil.

Principal Associated Soils:

These include Loei, Phu Sana, Muak Lek, Tha Yang, Lat Ya, Ban Chong, Hang Chat and Mae Rim series.

ANALYSIS RESULTS
(oven dry basis)

Profile code no.: NE-N - 25/38
Soil series: Chiang Khan (Ch)

| Lab No. | Depth (cm) | Horizon | Particle size distribution analysis (% by weight) | | | | | | | | Texture | | pH | | CaCO ₃ % | P, mg kg ⁻¹ Bray 2 | K, mg kg ⁻¹ NH ₄ OAc |
|---------|------------|---------|---|------|------|-----------------------|-----|-----|-----|------|---------|--------------------|-------|-----|---------------------|-------------------------------|--|
| | | | USDA grading | | | Sand-fraction grading | | | | | Lab | Field | 1:1 | 1:1 | | | |
| | | | sand | silt | clay | vc | c | m | f | vf | result | estim ⁿ | water | KCl | | | |
| 414787 | 0-5 | Ac | 41.8 | 29.0 | 29.2 | 3.3 | 7.5 | 8.4 | 7.3 | 15.3 | cl | gcl | 5.1 | 4.2 | | 5.8 | 90 |
| 414788 | 5-14 | ABc | 36.0 | 27.4 | 36.6 | 2.9 | 8.2 | 8.6 | 5.6 | 4.7 | cl | vgcl | 4.5 | 4.0 | | 2.8 | 57 |
| 414789 | 14-33 | Btc1 | 38.3 | 32.5 | 29.2 | 11.0 | 7.7 | 7.0 | 6.5 | 6.1 | cl | vgc | 5.0 | 4.0 | | 1.6 | 62 |
| 414790 | 33-71 | Btc2 | 33.2 | 22.3 | 44.5 | 9.1 | 6.7 | 6.2 | 5.3 | 5.9 | c | gc | 4.6 | 3.9 | | 1.2 | 52 |
| 414791 | 71-115+ | Btc3 | 9.8 | 24.3 | 65.9 | 2.0 | 1.7 | 1.7 | 1.7 | 2.7 | c | gc | 4.7 | 3.7 | | 1.4 | 65 |

| Depth (cm) | Air dried to oven dried | C % | N % | Exchange capacity and cations (cmol _(c) kg ⁻¹) | | | | | | | | | Base satur ⁿ (%) | | ECEC cmol _(c) kg ⁻¹ (B+D) | Al KCl extr. cmol _(c) kg ⁻¹ (D) | Electrical conduct ^y (ECx10 ⁶) dS m ⁻¹ |
|------------|-------------------------|------|-----|---|------|------|------|-----------------|-------------------|-----------|-----------------------------|---------------|-----------------------------|---------------|---|---|--|
| | | | | Ca | Mg | K | Na | SUM cations (B) | Extr. acidity (A) | SUM (B+A) | CEC NH ₄ OAc (C) | CEC 100g Clay | B/Cx100 | (Bx100)/(B+A) | | | |
| | | | | | | | | | | | | | | | | | |
| 0-5 | 2.0 | 1.08 | | 2.60 | 0.60 | 0.20 | 0.10 | 3.50 | 7.80 | 11.30 | 8.4 | 28.8 | 42 | 31 | | | 0.07 |
| 5-14 | 2.6 | 0.89 | | 1.40 | 0.40 | 0.10 | 0.20 | 2.10 | 8.50 | 10.60 | 6.1 | 16.7 | 34 | 20 | | | 0.04 |
| 14-33 | 3.6 | 0.62 | | 1.90 | 0.50 | 0.10 | 0.30 | 2.80 | 7.70 | 10.50 | 7.9 | 27.1 | 35 | 27 | | | 0.04 |
| 33-71 | 3.0 | 0.49 | | 0.30 | 0.30 | 0.05 | 0.20 | 0.85 | 8.70 | 9.55 | 5.1 | 11.5 | 17 | 9 | | | 0.03 |
| 71-115+ | 4.8 | 0.51 | | 0.70 | 0.50 | 0.10 | 0.20 | 1.50 | 13.00 | 14.50 | 11.4 | 17.3 | 13 | 10 | | | 0.01 |

Surveyor: Chalerm & Staff

Date: 26 May, 1981