

Proposed by:
 T. Charasaiya and J.D. Cowie, 1969
 Revised by:
 1. N. Chorphaka, 1987
 2. A. Potichan, 2004

CHIANG SAEN SERIES

Field Symbol: Ce

Distribution: Occupies moderate extent in northern Thailand.

Setting: Chiang Saen soils occur on the undulating to hilly terrains of dissected erosion surfaces. Slope range is from 3 to 35 percent. These soils are formed from colluvium or residuum derived from granite. The climate is Tropical Savanna (Koppen 'Aw'). The average annual precipitation is from 1,100 to 1,800 mm.

Drainage, Permeability and Runoff: Well drained. Runoff is slow to rapid. Permeability is estimated to be moderate.

Vegetation and Land Use: Mixed deciduous forest and dry evergreen forest still remains on the steeper slopes and parts of the hilly terrain. However most of the areas have been largely cleared for upland crops and fruit trees such as corn, upland rice, mungbean, peanut, mango, lychee, longan etc. Abandoned clearings are quickly invaded by regrowth forest, weeds and shrubs.

Characteristic Profile Features: Chiang Saen series is a member of the very-fine, kaolinitic, isohyperthermic Typic Kandustults. They are very deep soils and are characterized by a dark brown clay loam or clay A horizon overlying a red clay kandic B horizon. Reaction is moderately to slightly acid becoming very strongly or strongly acid in the deeper subsoil.

Typifying Pedon: Profile code no. is N-36/13 (moist color unless otherwise stated).

Location: Ban San Khong Ngam, Amphoe Mae Chan Changwat Chiang Rai.

Sheet Name: Amphoe Mae Chan

Sheet No.: 4949 II

Coordinate: 002307

Elevation: 375 m (MSL)

Relief: gently undulating

Slope: 4 %

Physiography: dissected erosional surface

Parent material: colluvium over residuum from granite

Drainage: well drained

Permeability: moderate

Runoff: slow

Ground water depth: >2 m

Flooding depth: -

Duration: -

Frequency: -

Annual rainfall: 1,570 mm

Mean temp.: 24.0 °C

Climate type: Tropical Savannah (Aw)

Natural vegetation or land use: secondary forest, shrubs, weeds, upland crops

Described by: Thamrong and J.D. Cowie

Date: 22 January, 1969

Revised by: Aniruth Potichan

Date: 23 May, 2004

Horizon	Depth (cm)	Description
A	0-2	Dark brown (7.5YR3/2) clay; moderate fine and very fine granular structure; very friable, sticky and slightly plastic; abundant fine and very fine roots; medium acid (field pH 6.0); abrupt and wavy boundary.
AB	2-16	Dark reddish brown (5YR3/3) moist, dark reddish brown (5YR3/3) to reddish brown (2.5YR4/4) dry, clay; strong medium and fine subangular blocky with some granular structure in the top 4 cm; friable, sticky and slightly plastic; common pieces of charcoal; many fine and very fine roots; strongly acid (field pH 5.5); abrupt and wavy boundary.
Bt1	16-54	Dark reddish brown (2.5YR3/4) moist, dark reddish brown (2.5YR3/4) dry, clay; moderate coarse subangular blocky breaking to medium and fine subangular blocky structure; firm, sticky and slightly plastic; continuous very thin cutans in some pores; few strongly weathered rock fragments, few

		pieces of charcoal; few very fine roots; very strongly acid (field pH 4.5); clear and wavy boundary.
Bt2	54-94	Dark red (2.5YR3/6) clay; moderate medium and fine subangular blocky structure; friable to firm, sticky and slightly plastic; patchy thin cutans in pores; very few strongly weathered rock fragments; very few very fine roots; very strongly acid (field pH 4.5); gradual and wavy boundary.
Bt3	94-110+	Red (10R4/6) clay; moderate medium and fine subangular blocky structure; firm, sticky and slightly plastic; broken moderately thick cutans mainly on ped faces and in pores; very few very fine roots; very strongly acid (field pH 4.5).

Type location:

Chiang Saen series was named for Chiang Saen district, Chiang Rai province

Range of Profile Features:

The A horizon range from 10 to 20 cm in thickness and has 7.5YR or 5YR hues, values of 3 through 4 and chromas of 2 through 4, clay loam or clay texture. The structure is moderate to strong fine and medium blocky and granular.

The B horizon has 2.5YR or 10R hues, values of 3 through 4, (or values of 5 below approximately 80 cm), chromas of 4 to 6 with clay texture. The kandic B horizon shows evidence of clay translocation in the form of cutans on ped faces and in pores. The structure is moderate to strong medium and fine blocky. Locally, few to frequent weathering iron rich rock fragments may occur in the B horizon below 90 cm. The pH values range from 5.5 to 6.5 in the A horizon and from 4.5 to 5.5 in the B horizon.

The upper 15 cm of the argillic B horizon has an organic matter content of 1.5 percent or more.

Similar Soil Series:

Ban Chong series (Bg): has browner colors (7.5YR to 5YR hues, less organic matter and derived from shale and metamorphic equivalents (Paleustults).

Loei series (Lo): derived from granite associated with shale and metamorphic equivalent rocks.

Chiang Khong series (Cg): derived from intermediate and basic igneous rocks especially andesite.

Principal Associated Soils:

These include Pong Tong and Nong Mot series.

ANALYSIS RESULTS
(oven dry basis)

Profile code no.: N-36/13
Soil series: Chiang Saen (Ce)

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
P-444	0-2	A	15.2	24.4	60.4						c	c	5.5	5.0		30.7	282
P-444a	2-16	AB	14.6	24.8	60.6						c	c	5.5	5.0		13.3	75
P-445	16/-54	Bt1	12.5	12.7	74.8						c	c	5.0	4.2		17.4	46
P-446	54-94	Bt2	9.3	8.8	81.9						c	c	4.7	3.9		30.4	13
P-447	94-110+	Bt3	7.1	7.1	85.8						c	c	4.6	3.9		13.9	10

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol ₍₊₎ kg ⁻¹)										Base satur ⁿ (%)		ECEC cmol ₍₊₎ kg ⁻¹ (B+D)	Al KCl extr. cmol ₍₊₎ 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)				
0-2	3.5	1.68		7.70	6.60	0.40	0.20	14.90	19.40	34.30	27.5	45.5	54	43			0.02	
2-16	2.7	1.30		3.30	1.90	0.10	0.20	5.50	19.80	25.30	18.7	30.9	29	22			0.03	
16/-54	2.4	1.78		2.20	1.10	0.10	0.20	3.60	19.90	23.50	16.1	21.5	22	15			0.02	
54-94	2.2	0.92		0.50	0.40	<0.1	0.20	1.10	21.40	22.50	13.1	16.0	8	5			0.01	
94-110+	1.9	0.52		0.40	0.10	<0.1	0.20	0.70	12.10	12.80	9.0	10.5	8	5			0.01	

Surveyor: Thamrong and J.D. Cowie

Date: 22 January, 1969