



CIAT

65447c.2

COLECCION HISTORICA

~~THE BOLIVIAN SAVANNAS. SOME PRELIMINARY INFORMATION  
ON THEIR SUITABILITY FOR RICE PRODUCTION~~



BIBLIOTECA

77-50-830

60390

Peter G. Jones  
Centro Internacional de Agricultura Tropical - CIAT  
December 1985

The Bolivian savannas lie between and around the rivers Beni and Mamore. See map attached. (The scale is 1:1,000,000. 1 mm = 1 km) The area is predominantly poorly drained and interspersed vegetation is mainly Semi Evergreen seasonal forest with palms along the water courses.

#### LAND SYSTEMS

Of the brief landsystem descriptions that follow only 403, 409, 410, 411, 412, and 425 contain significant proportions of savanna vegetation. All include poorly drained land; 412 and 425 are almost completely waterlogged and are denoted as separate on the map.

403 is a well-drained, highly acidic Oxisol in an area of less than optimal rainfall, thus unsuitable for consideration.

409 borders on a slightly better climatic regime but the soil is a highly infertile Ultisol. Access problems would be severe (See below).

410 is generally poorly drained but some characteristics of its major soil (Tropaqualf) are noticeably better than those around it. The rainfall should be adequate at least in the south western regions. The soil is lateritic and in better drained higher parts indurated plinthite can be found. Much of the landscape is however flat and low lying and with good management the laterite should not present serious problems.

Note: TTC found examples of these soils near Trinidad still waterlogged in June. Nevertheless they are free of stones, with good root penetration to 30-40 cm. They were under pasture. Phosphorus very variable 33 ppm in one case, 5 ppm in another. CEC 9 to 17 MEQ 100 G SOIL and base saturation in excess of 60%.

## CLIMATE

As in Colombia a marked rainfall gradient exists in the Andean piedmont and out onto the plains within the region of andean influence. Although not shown clearly on the map for lack of met stations the isohyets should run roughly NW-SE with the piedmont systems 835, 415, 416, 420, lying along the 2000 mm isohyet. The area is subject to polar frontal weather during winter. From May to August marked cold spells occur due to frontal activity (cf. Friagens of Brasil). Mean temperature during the growing season is however approx 26° C.

## ACCESS

The only all weather road in the region runs from Trinidad to San Ignacio de Moxos. Dry weather roads connect the area with Santa Cruz, Cochabamba and La Paz but it is doubtful that they are passable for more than a few months of the year.

Year round traffic should be possible from:

- 1) Rurrenabaque via the rio Beni to Puerto Linares and then via all weather road to La Paz.
- 2) Trinidad via the rio Ichilo to Puerto Villaroel and then via all weather road to Cochabamba.
- 3) River traffic from Trinidad to Santa Cruz may be possible but I can find no confirmation of this.

## CONCLUSIONS

The most likely areas to investigate are the southern extension of land system 410 around Trinidad. These would appear to offer the best soils climate and possibility of an infrastructure.

The extension of system 410 to the west terminating at Rurrenabaque deserves attention because of higher stabler rainfall and the likelihood of easier access to La Paz.

## REFERENCES

- MAPA POLITICO DE BOLIVIA. 1979. Scale 1:3,000,000. Editorial Navarrete.
- ONC Sheet No.26. Defense Mapping Agency Aerospace Centre, Missouri. Edition 3. Oct. 1977.
- COCHRANE, T.T. 1973. El Potencial Agricola del Uso de la Tierra en Bolivia. Un mapa de sistemas de tierras. Don Bosco - La Paz, Bolivia. 1973.
- COCHRANE, T.T. et al. 1985. Land in Tropical America. CIAT. (In press).
- JONES, P.G. 1985. SAMMATA. South and Central America Monthly Meteorological Data Retrieval System. Users Manual. CIAT. (Unpub mss).

LANDSYSTEM 402 ALTITUDE 220 METRES AREA 633 KM SQUARE

THE REGION IS DRAINED BY A NUMBER OF SMALL RIVERS THAT FLOW MAINLY TOWARDS THE MADEIRA AND BENI RIVERS. SWAMPS AND OTHER LOW LYING POORLY DRAINED AREAS ARE COMMON THROUGHOUT THE REGION

	FA CET 1 54% AREA	FA CET 2 45% AREA
VEGETATION	SEMI EVERGREEN SEASONAL FOREST	PALM FOREST
SOIL	ACRORTHDX	HAPLORTHDX
DRAINAGE	GOOD	POOR
PH	<5.2	<5.2
CEC	<4 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	CLAY	CLAY
AL SATN	40-70%	10-40%
PHOSPHORUS	<1 PPM	1-5 PPM

LANDSYSTEM 403 ALTITUDE 200 METRES AREA 195 KM SQUARE

ABOUT 40% OF THE REGION HAS WET SEASON DRAINAGE PROBLEMS, BUT THESE AREAS ARE MOSAICED BY HIGHER, MORE WELL DRAINED LANDS. THE SYSTEM IS DRAINED BY TRIBUTARIES OF THE BENI AND NAMORE RIVERS

	FA CET 1 60% AREA	FA CET 2 30% AREA	FA CET 3 10% AREA
VEGETATION	SAVANNA (CANFO LIMPO & SUJO)	POORLY DRAINED SAVANNA	SEMI EVERGREEN SEASONAL FOREST
SOIL	HAPLORTHDX	HAPLORTHDX	HAPLORTHDX
DRAINAGE	GOOD	POOR	GOOD
PH	<5.2	<5.2	5.2-7.3
CEC	4-8 MEQ/100G SOIL	<4 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	CLAY	CLAY	CLAY
AL SATN	10-40%	<10%	10-40%
PHOSPHORUS	1-5 PPM	1-5 PPM	1-5 PPM

LANDSYSTEM 404 - ALTITUDE 160 METRES AREA 20 KM SQUARE

MUCH OF THE AREA IS SUSCEPTIBLE TO ANNUAL FLOODING

	FACET 1 80% AREA	FACET 2 20% AREA
VEGETATION	PALM FOREST	SEMI EVERGREEN SEASONAL FOREST
SOIL	PSAMMAQUENT	TROPICFLUENT
DRAINAGE	POOR	GOOD
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	SAND	SAND
AL SATN	<10%	<10%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 405 ALTITUDE 160 METRES AREA 40 KM SQUARE

MUCH OF THE AREA IS SUSCEPTIBLE TO ANNUAL FLOODING

	FACET 1 70% AREA	FACET 2 30% AREA
VEGETATION	GALLERY FOREST & PALMS	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPICFLUENT	TROPICFLUENT
DRAINAGE	POOR	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	LOAM	LOAM
AL SATN	<10%	<10%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 406 ALTITUDE 180 METRES AREA 47 KM SQUARE

THERE ARE MANY SMALL LAKES FORMED IN OXBOWS OF THE BENI RIVER. A LARGE PROPORTION OF THE LAND IS SUBJECT TO PERIODIC FLOODING.

FACET 1 70% AREA FACET 2 30% AREA

VEGETATION	TROPICAL RAIN FOREST & PALMS	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPOFLUVENT	TROPOFLUVENT
DRAINAGE	POOR	GOOD
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	SAND	LOAM
AL SATN	<10%	<10%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 407 ALTITUDE 180 METRES AREA 98 KM SQUARE

MORE THAN 60% OF THESE LANDS ARE SUBJECT TO WET SEASON FLOODING. THERE ARE NUMEROUS OXBOWS LAGOONS AND SWAMPS ALONG THE COURSE OF THE MANORE RIVER.

FACET 1 65% AREA FACET 2 35% AREA

VEGETATION	MAINLY PALM FOREST	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPOAQUENT	TROPOFLUVENT
DRAINAGE	POOR	GOOD
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	LOAM	CLAY
AL SATN	<10%	<10%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 408 ALTITUDE 200 METRES AREA 47 KM SQUARE

THE REGION IS LOW LYING AND POORLY DRAINED, TERRAIN BROKEN AND SEASONALLY FLOODED.

	FACE 1 80% AREA	FACE 2 20% AREA
VEGETATION	TROPICAL RAIN FOREST WITH PALMS	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPAQUENT	HAPLORTHOX
DRAINAGE	POOR	GOOD
PH	5.2-7.3	>5.2
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	CLAY	CLAY
AL SATN	<10%	10-40%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 409 ALTITUDE 220 METRES AREA 260 KM SQUARE

OVER 50% OF THE REGION SUFFERS FROM WET SEASON WATERLOGGING, BUT THE LANDSCAPE IS SOMEWHAT BETTER DRAINED THAN MUCH OF THE SOUTHERN PAMPAS.

	FACE 1 85% AREA	FACE 2 15% AREA
VEGETATION	SEASONALLY FLOODED SAVANNAH	SEMI EVERGREEN FOREST AND PALMS
SOIL	TROPADUULT	HAPLORTHOX
DRAINAGE	POOR	GOOD
PH	<5.2	<5.2
CEC	4-8 MEQ/100G SOIL	<4 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	CLAY
AL SATN	10-40%	10-40%
PHOSPHORUS	<1 PPM	<1 PPM

LANDSYSTEM 410 ALTITUDE 200 METRES AREA 556 KM SQUARE

MUCH OF THE TERRAIN SUFFERS FROM ANNUAL FLOODING AS A RESULT OF THE IMPERVIOUS B HORIZON OF MANY OF THE SOILS AND CONSEQUENT POOR INTERNAL DRAINAGE. SOME FLOODING OCCURS BY RIVERS BREAKING THEIR BANKS. THE SO CALLED "SQUARE LAKES", THE RESULT OF FRACTURING IN THE UNDERLYING CRYSTALLINE BASEMENT ARE COMMON THROUGHOUT THE SYSTEM AND PROVIDE IMPORTANT RESERVES FOR DRY SEASON STOCK WATERING

	FACET 1 90% AREA	FACET 2 10% AREA
VEGETATION	POORLY DRAINED SAVANNA	SEMI EVERGREEN FOREST WITH PALMS
SOIL	TROPADUALF	TROPOLUVENT
DRAINAGE	POOR	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM
AL SATN	10-40%	<10%
PHOSPHORUS	>5 PPM	>5 PPM

LANDSYSTEM 411 ALTITUDE 230 METRES AREA 137 KM SQUARE

	FACET 1 70% AREA	FACET 2 15% AREA	FACET 3 15% AREA
VEGETATION	POORLY DRAINED SAVANNA	POORLY DRAINED SAVANNA	SEASONAL FOREST
SOIL	TROPADUULT	TROPADUALF	TROPUSTULT
DRAINAGE	POOR	POOR	GOOD
PH	<5.2	<5.2	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	SAND OVER CLAY	LOAM OVER CLAY	SAND OVER LOAM
AL SATN	40-70%	10/40%	<10%
PHOSPHORUS	>5 PPM	>5 PPM	1-5 PPM



LANDSYSTEM 412 ALTITUDE 200 METRES AREA 47 KM SQUARE

THE REGION IS SUBJECT TO PROLONGED WATERLOGGING

    | FACET 1 90% AREA | FACET 2 10% AREA |

VEGETATION	POORLY-DRAINED SAVANNA	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPADULT	TROPOLUVENT
DRAINAGE	POOR	GOOD
PH	5.2	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM
AL SATN	40-70%	<10%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 413 ALTITUDE 220 METRES AREA 128 KM SQUARE

MUCH OF THE SYSTEM IS LOW LYING AND SOMEWHAT POORLY DRAINED, AND GILGAI MICRORELIEF IS COMMON

    | FACET 1 80% AREA | FACET 2 20% AREA |

VEGETATION	SEBF AND PALMS	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPADULT	TROPOLUVENT
DRAINAGE	DEFICIENT	GOOD
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM
AL SATN	10-40%	<10%
PHOSPHORUS	1-5 PPM	>5 PPM

LANDSYSTEM 414 ALTITUDE 220 METRES AREA 50 KM SQUARE

THE AREA HAS A DRAINAGE PROBLEM. POSSIBLE 50%

FACET 1 55% AREA FACET 2 45% AREA

VEGETATION	SEMI EVERGREEN SEASONAL FOREST	SESF & PALMS
SOIL	TROPICLUVENT	RHODUSTALF
DRAINAGE	GOOD	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM OVER CLAY
AL SATN	<10%	<10%
PHOSPHORUS	>5 PPM	>5 PPM

LANDSYSTEM 415 ALTITUDE 280 METRES AREA 26 KM SQUARE

FACET 1 55% AREA FACET 2 45% AREA

VEGETATION	SEMI EVERGREEN SEASONAL FOREST	SESF & PALMS
SOIL	EUTROPEPT	EUTROPEPT
DRAINAGE	GOOD	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER SAND	LOAM OVER CLAY
AL SATN	<10%	40-70%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 416 ALTITUDE 600 METRES AREA 22 KM SQUARE

THE SYSTEM IS DRAINED BY NUMEROUS SMALL TRIBUTARIES OF THE AMAZON RIVER SYSTEM. DUE TO THE BROKEN AND OFTEN VERY STEEP TOPOGRAPHY ACTIVE EROSION IS TAKING PLACE IN SPITE OF THE FOREST COVER.

FACET 1 60% AREA FACET 2 40% AREA

VEGETATION	FOREST	FOREST
SOIL	TROPORTHENT	TROPORTHEPT
DRAINAGE	GOOD	GOOD
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	LOAM OVER ROCK	LOAM
AL SATN	10-40%	10-40%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 417 ALTITUDE 400 METRES AREA 44 KM SQUARE

FACET 1 75% AREA FACET 2 25% AREA

VEGETATION	FOREST	FOREST
SOIL	HAPLORTHDX	DYSTROPEPT
DRAINAGE	GOOD	GOOD
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	LOAM	LOAM
AL SATN	20%	10-40%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 418 ALTITUDE 250 METRES AREA 17 KM SQUARE

	FACET 1 80% AREA	FACET 2 20% AREA
VEGETATION	SEMI EVERGREEN SEASONAL FOREST	SESF & PALMS
SOIL	TROPUDALF	TROPUDALF
DRAINAGE	GOOD	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	4-8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM OVER CLAY
AL SATN	10-40%	10-40%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 419 ALTITUDE 300 METRES AREA 8 KM SQUARE

	FACET 1 100% AREA
VEGETATION	TROPICAL RAIN FOREST
SOIL	TROPOPSAMMENT
DRAINAGE	GOOD
PH	5.2-7.3
CEC	>8 MEQ/100G SOIL
TEXTURE	SAND
AL SATN	<10%
PHOSPHORUS	1-5 PPM

LANDSYSTEM 420 ALTITUDE 340 METRES AREA 7 KM SQUARE

	! FACET 1 80% AREA !	! FACET 2 20% AREA !
VEGETATION	TROPICAL RAIN FOREST	TROPICAL RAIN FOREST AND PALMS
SOIL	TROPUDULT	TROPUDULT
DRAINAGE	GOOD	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	4-8 MED/100G SOIL	4-8 MED/100G SOIL
TEXTURE	SAND OVER LOAM	LOAM OVER CLAY
AL SATN	<10%	10-40%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 421 ALTITUDE 280 METRES AREA 111 KM SQUARE

MUCH OF THE REGION IS LOW LYING AND IN SOME PLACES WATER REMAINS ON THE SURFACE FOR PERIODS DURING THE WET SEASON. DRAINAGE IS BY NUMEROUS SMALL TRIBUTARIES THAT OFTEN BREAK THEIR BANKS AT PEAK FLOW TIME.

	! FACET 1 85% AREA !	! FACET 2 15% AREA !
VEGETATION	TROPICAL RAIN FOREST AND PALMS	TROPICAL RAIN FOREST
SOIL	TROPADULT	TROPUDULT
DRAINAGE	POOR	DEFICIENT
PH	<5.2	<5.2
CEC	4-8 MED/100G SOIL	4-8 MED/100G SOIL
TEXTURE	LOAM	LOAM
AL SATN	>70%	>70%
PHOSPHORUS	<1 PPM	<1 PPM

LANDSYSTEM 422 ALTITUDE 280 METRES AREA 45 KM SQUARE

	FACET 1 85% AREA	FACET 2 15% AREA
VEGETATION	TROPICAL RAIN FOREST & PALMS	TROPICAL RAIN FOREST
SOIL	TROPAQUULT	TROPUDULT
DRAINAGE	POOR	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	<4 MEQ/100G SOIL	<4 MEQ/100G SOIL
TEXTURE	LOAM	LOAM
AL SATN	40-70%	40-70%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 423 ALTITUDE 600 METRES AREA 12 KM SQUARE

	FACET 1 55% AREA	FACET 2 45% AREA
VEGETATION	TROPICAL RAIN FOREST	TROPICAL RAIN FOREST
SOIL	TROPUDULT	TROPUDULT
DRAINAGE	GOOD	GOOD
PH	<5.2	<5.2
CEC	<4 MEQ/100G SOIL	4-8 MEQ/100G SOIL
TEXTURE	LOAM	LOAM
AL SATN	>70%	40-70%
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 424 ALTITUDE 280 METRES AREA 9 KM SQUARE

| FACET 1 100% AREA |

VEGETATION	TROPICAL RAIN FOREST
SOIL	TROPFLUVENT
DRAINAGE	GOOD
PH	5.2-7.3
CEC	>8 MEQ/100G SOIL
TEXTURE	LOAM
AL SATN	<10%
PHOSPHORUS	>5 PPM

LANDSYSTEM 425 ALTITUDE 210 METRES AREA 54 KM SQUARE

DUE TO POOR SOIL DRAINAGE THE LAND SUFFERS FROM PROLONGED WET SEASON FLOODING

| FACET 1 85% AREA | FACET 2 15% AREA |

VEGETATION	POORLY DRAINED SAVANNA	SEBF & PALMS
SOIL	TROPDUALF	TROPFLUVENT
DRAINAGE	POOR	DEFICIENT
PH	5.2-7.3	5.2-7.7
CEC	4-8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM
AL SATN	40-70%	<10%
PHOSPHORUS	1-5 PPM	>5 PPM

LANDSYSTEM 468 ALTITUDE 200 METRES AREA 40 KM SQUARE

MUCH OF THE REGION IS SUBJECT TO WET SEASON WATERLOGGING.  
"SQUARE LAKES" ARE COMMON.

! FACET 1 85% AREA ! FACET 2 15% AREA !

VEGETATION	SEMI EVERGREEN FOREST AND PALMS	SEMI EVERGREEN FOREST
SOIL	TROPAQUALF	EUTROFEPT
DRAINAGE	POOR	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	CLAY	LOAM
AL SATN	<10%	<10%
PHOSPHORUS	>5 PPM	>5 PPM

LANDSYSTEM 472 ALTITUDE 235 METRES AREA 19 KM SQUARE

ABOUT 50% OF THE AREA IS AFFECTED BY FLOODING IN THE WET SEASON.  
SWAMPS ARE COMMON AND "SQUARE LAKES" MAY BE FOUND.

! FACET 1 55% AREA ! FACET 2 45% AREA !

VEGETATION	SEMI DECIDUOUS SEASONAL FOREST	SEMI DECIDUOUS SEASONAL FOREST
SOIL	FLUVAQUEPT	USTAQUEPT
DRAINAGE	POOR (SEASONALLY FLOODED)	GOOD
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	CLAY	LOAM
AL SATN	<10%	<10%
PHOSPHORUS	>5 PPM	>5 PPM



LANDSYSTEM 474 ALTITUDE 350 METRES AREA 146 KM SQUARE

	FACE 1 60% AREA	FACE 2 40% AREA
VEGETATION	SEMI DECIDUOUS SEASONAL FOREST	SEMI DECIDUOUS SEASONAL FOREST
SOIL	HAPLUSTOX	HAPLUSTOX
DRAINAGE	GOOD	GOOD
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	CLAY	CLAY
AL SATN	10-40%	<10% (10-40% AT DEPTH)
PHOSPHORUS	1-5 PPM	1-5 PPM

LANDSYSTEM 478 ALTITUDE 200 METRES AREA 164 KM SQUARE

MUCH OF THE AREA IS POORLY DRAINED AND SUFFERS FROM PROLONGED FLOODING

	FACE 1 85% AREA	FACE 2 15% AREA
VEGETATION	SESF AND PALMS	SEMI EVERGREEN SEASONAL FOREST
SOIL	TROPAQUALF	EUTROPEPT
DRAINAGE	POOR	DEFICIENT
PH	5.2-7.3	5.2-7.3
CEC	>8 MEQ/100G SOIL	>8 MEQ/100G SOIL
TEXTURE	LOAM OVER CLAY	LOAM
AL SATN	<10%	<10%
PHOSPHORUS	1-5 PPM	1-5 PPM

ESTACION : S. IGNACIO DE MORA PAIS : BOLIVIA LATITUD 14 52'N LONGITUD 66 36'W ELEVACION 220 MTS.

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTIEMBRE	OCTUBRE	NOVIEMBRE	DIEMBRE
PRECIPITACION (MMS)	-1	61	1	5	4	1	0	0	0	0	1	0	0	0	0
PRECIP. 75% (MMS)	-1	61	10	3	3	1	0	0	0	0	1	0	0	0	0
EVTR POT HARG (MMS)	-1	61	12	97	83	89	78	62	52	61	79	100	113	113	104
TEMP. MED. (CENT)	-1	61	1	26.0	26.1	25.7	24.9	22.9	20.9	20.2	22.1	24.8	25.9	26.5	26.5
HUM. REL. MED. (%)	-1	61	1	65	66	65	63	66	66	63	60	76	78	79	80
VEL. MED. VIENTO (M/S)	-1	61	59	2.8	2.3	2.1	2.0	1.8	1.9	1.7	2.3	2.6	2.9	2.6	2.7

*Datos incorrecto*

ESTACION : SAN BORJA PAIS : BOLIVIA LATITUD 14 46'N LONGITUD 66 34'W ELEVACION 225 MTS.

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTIEMBRE	OCTUBRE	NOVIEMBRE	DIEMBRE
PRECIPITACION (MMS)	20	3	1	298	258	209	123	98	79	65	46	63	128	134	225
PRECIP. 75% (MMS)	-1	24	10	196	166	134	75	58	45	35	22	34	78	83	145
EVTR POT HARG (MMS)	-1	24	12	128	133	128	115	102	110	112	109	106	147	141	152
TEMP. MED. (CENT)	20	3	1	26.8	26.5	23.7	26.1	22.1	23.0	22.7	24.9	26.9	27.9	25.3	27.1
RAD. GLOBAL (MJ/MSQ)	-1	24	11	16.7	19.2	18.0	15.7	14.8	16.3	16.1	14.8	17.1	18.6	19.7	19.7
HORASSOL (N/N) (%)	-1	24	1	29	40	40	38	45	63	57	39	40	39	40	40

ESTACION : TRINIDAD PAIS : BOLIVIA LATITUD 14 44'N LONGITUD 64 47'W ELEVACION 235 MTS.

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTIEMBRE	OCTUBRE	NOVIEMBRE	DIEMBRE
PRECIPITACION (MMS)	20	3	1	307	269	192	139	83	69	51	39	65	142	176	249
PRECIP. 75% (MMS)	-1	24	10	202	176	123	86	47	38	25	17	49	68	113	162
EVTR POT HARG (MMS)	-1	24	12	130	135	137	114	107	107	112	125	129	143	150	152
DIAS DE LLUVIA	-1	59	56	16.0	14.0	12.0	7.0	7.0	4.0	3.0	2.0	6.0	6.0	9.0	13.0
TEMP. MAX. (CENT)	-1	61	1	31.4	31.4	31.1	30.5	29.5	28.7	29.3	29.9	33.3	32.7	32.9	31.9
TEMP. MIN. (CENT)	-1	61	1	22.0	22.1	21.7	20.9	18.7	16.7	15.7	16.5	19.1	20.6	21.1	21.7
TEMP. MED. (CENT)	20	3	1	27.3	27.3	27.4	26.4	25.2	23.9	23.7	25.7	27.7	27.9	26.0	27.9
HUM. REL. MED. (%)	-1	61	1	78	78	76	76	76	74	70	65	66	69	70	75
RAD. GLOBAL (MJ/MSQ)	-1	24	11	16.7	19.2	17.6	15.5	14.4	15.5	15.7	16.7	16.9	18.2	19.7	19.2
HORASSOL (N/N) (%)	-1	24	1	29	40	39	37	42	56	54	49	39	37	40	38
VEL. MED. VIENTO (M/S)	-1	61	59	4.1	3.5	3.0	2.9	2.8	3.1	2.8	3.6	4.2	4.0	3.8	3.9

ESTACION : SANTA ANA  
ELEVACION 219 MTS.

PAIS : BOLIVIA

LATITUD 10 44'N

LONGITUD 65 04 W

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTERE	OCTUBRE	NOVEMBRE	DICIEMBRE
PRECIPITACION (MMS)	19	3	1	241	226	214	141	77	38	25	39	75	151	176	230
PRECIP. 75% (MMS)	-1	24	10	156	146	138	87	43	16	7	17	42	94	112	149
EVTR POT HARG (MMS)	-1	24	12	120	124	128	100	103	107	112	126	124	136	133	106
TEMP. MED. (CENT)	19	3	1	27.1	27.5	27.7	27.6	25.6	23.9	23.9	25.5	27.6	27.7	27.6	25.3
HUM. REL. MED. (%)	-1	61	1	81	79	79	76	75	73	68	56	64	70	75	77
RAD.GLOBAL (MJ/MSQ)	-1	24	11	15.5	17.6	16.3	13.2	14.4	15.3	15.7	17.1	16.3	17.4	17.6	18.4
HORASSOL (N/N) (%)	-1	24	1	25	34	33	27	41	54	53	50	35	34	33	35
VEL.MED.VIENTO(M/S)	-1	61	59	4.1	3.3	2.8	2.6	2.6	2.8	2.9	3.5	3.4	3.6	3.1	3.6

ESTACION : RURRENABAQUE

PAIS : BOLIVIA

LATITUD 14 24'N

LONGITUD 67 34'W

ELEVACION 226 MTS.

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTERE	OCTUBRE	NOVEMBRE	DICIEMBRE
PRECIPITACION (MMS)	20	3	1	275	279	206	111	104	120	93	56	73	112	150	229
PRECIP. 75% (MMS)	-1	24	10	180	183	132	67	62	73	54	29	40	67	94	147
EVTR POT HARG (MMS)	-1	53	12	193	157	159	165	122	105	110	131	155	169	193	194
TEMP. MAX. (CENT)	-1	61	1	31.4	31.2	31.1	30.8	29.3	28.2	28.7	30.6	32.0	32.9	31.9	31.2
TEMP. MIN. (CENT)	-1	61	1	21.7	21.7	20.9	20.1	18.1	16.5	15.9	16.0	16.0	20.0	20.5	21.5
TEMP. MED. (CENT)	20	3	1	26.8	26.9	26.5	25.3	24.6	23.6	22.6	24.6	26.8	27.3	27.5	27.2
HUM. REL. MED. (%)	-1	61	1	82	83	81	80	81	83	79	74	70	74	76	79
RAD.GLOBAL (MJ/MSQ)	-1	60	58	25.1	22.6	20.9	23.0	16.7	15.5	15.9	18.0	20.9	21.6	25.5	25.1
HORASSOL (N/N) (%)	-1	24	1	30	47	35	29	42	53	54	50	38	37	55	58
VEL.MED.VIENTO(M/S)	-1	61	59	1.2	1.0	1.0	0.9	0.8	0.7	0.9	1.2	1.4	1.5	1.3	1.2

ESTACION : ALCOCHE

PAIS : BOLIVIA

LATITUD 15 42'N

LONGITUD 67 39'W

ELEVACION 559 MTS.

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTERE	OCTUBRE	NOVEMBRE	DICIEMBRE
PRECIPITACION (MMS)	11	3	1	239	207	185	122	67	37	31	62	113	134	165	260
PRECIP. 75% (MMS)	-1	24	10	154	133	118	74	36	16	11	33	68	83	104	163
EVTR POT HARG (MMS)	-1	53	12	169	156	155	153	119	102	113	131	155	172	195	157
TEMP. MED. (CENT)	11	3	1	26.1	26.0	25.2	24.6	23.5	22.1	21.8	23.8	25.0	25.6	26.1	25.5
RAD.GLOBAL (MJ/MSQ)	-1	60	58	25.1	23.0	20.9	21.8	16.7	15.5	16.7	18.4	21.8	23.0	27.1	25.1
HORASSOL (N/N) (%)	-1	24	1	35	51	48	48	69	65	62	50	46	46	47	48

ESTACION : TODOS SANTOS  
ELEVACION 299 MTS.

PAIS : BOLIVIA

LATITUD 16 47'N

LONGITUD 65 7'W

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTBRE	OCTUBRE	NOVRE	DICBRE
PRECIPITACION (MMS)	17	3	1	491	357	382	247	175	126	122	86	103	215	206	400
PRECIP. 75% (MMS)	-1	24	10	329	236	254	160	111	77	74	49	61	138	132	266
EVTR POT HARG (MMS)	-1	53	12	161	159	158	153	107	102	103	127	146	171	201	194
TEMP. MED. (CENT)	17	3	1	26.3	26.7	26.1	24.6	22.4	21.9	20.2	22.4	24.2	26.3	26.7	27.1
HUM. REL. MED. (%)	-1	61	1	83	84	83	82	81	79	72	65	64	68	72	74
RAD.GLOBAL (MJ/MSQ)	-1	60	58	23.8	23.0	20.9	22.2	15.5	15.5	15.9	16.4	20.9	22.6	27.2	25.1
HORASSOL (N/N) (%)	-1	24	1	33	43	45	47	53	58	62	51	45	41	43	40
VEL.MED.VIENTO(M/S)	-1	61	59	1.4	1.0	1.2	1.2	1.0	1.1	1.0	1.2	1.3	1.4	1.2	1.4

ESTACION : SAN JOAQUIN

PAIS : BOLIVIA

LATITUD 13 3'N

LONGITUD 64 47'W

ELEVACION 202 MTS.

TIPO DE DATO	ANOS	NREF	NORG	ENERO	FEBRERO	MARZO	ABRIL	MAYO	JUNIO	JULIO	AGOSTO	SEPTBRE	OCTUBRE	NOVRE	DICBRE
PRECIPITACION (MMS)	10	3	1	173	223	164	121	63	47	12	0	130	134	165	213
PRECIP. 75% (MMS)	-1	24	10	109	144	117	74	34	23	0	0	79	83	118	137
EVTR POT HARG (MMS)	-1	24	12	118	122	126	100	109	109	115	124	120	133	132	143
TEMP. MED. (CENT)	10	3	1	26.5	26.8	27.1	27.8	26.2	24.5	24.8	24.4	26.5	26.8	27.2	27.3
RAD.GLOBAL (MJ/MSQ)	-1	24	11	15.5	17.6	16.3	13.2	14.4	15.5	15.7	17.1	16.3	17.4	17.6	18.4
HORASSOL (N/N) (%)	-1	24	1	25	34	33	26	40	53	51	49	35	34	33	36