Site No.	soil sampling · mod catchment · madhya pradesh · india
001	

Location	Date	UTM Coordinates	altitude (m)
Dhagnitalai	28/1/2006	x 0445012 Y 2503990	365

General Description

Position	Description	Surface Structure	Land Cover
Field near settlement, minor local depression	darl-brown soil without clear startification; top-soil is broken open, densely rooted up to 20cm, no roots beyond 70 cm, gravels increase with depth (granite)	cultivated w/out standing crop, no cracks, slightly falling slope (E)	part of gram field, currently fallow

Parent Material	Stoniness	Layering	Infiltration Rate
pahoehoe/ montmorillonite	light	not layered	60 mm/h

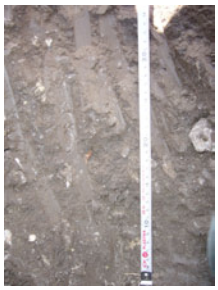
Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
1.1	10YR5/3	1.2	10YR5/5
USDA class: clay loam	gravel 13.00	USDA class: loam	gravel 19.18
	sand 29.80		sand 40.24
BulkDensity: 2.10 g/cm3	silt 34.36	BulkDensity: 1.77 g/cm3	silt 33.56
	(%) clay 35.76		(%) clay 26.20
pH 9.06	(%) Corg 1.64	pH 8.73	(%) Corg 0.53
	CEC		CEC 381.52

Sample No.	Munsell color	Sample No.	Munsell color
1.3	10YR5.2		
USDA class: clay loam	gravel 15.70	USDA class	gravel
	sand 33.88		sand
BulkDensity: 1.64 g/cm3	silt 32.36	BulkDensity: g/cm3	silt
	(%) clay 33.76		(%) clay
pH 8.92	(%) Corg 0.8	pH	(%) Corg
	CEC		CEC

Profile

0-15 cm
turbulated top-soil
.
15-45 cm
solid loam, ø 2cm
gravel, rooted
SAMPLE 1.2
.
45-80 cm
solid but easily
squeezable, partly
peatlike dark soil,
moist, ø 3cm gravel
SAMPLE 1.3
.
>80 cm
dark-brown,
solidified, ø >10cm
granite stones;
bedrock highly
weathered pahoehoe
w/ feldspath SAMPLE 1.1



Site No.	soil sampling · mod catchment · madhya pradesh · india
002	

Location	Date	UTM Coordinates	altitude (m)
near Baldimoi	28/1/2006	x 0445867 Y 2503767	365

General Description

Position	Description	Surface Structure	Land Cover
hill top of fallow stony wasteland near road	very compressed gravelly red soil layer on bedrock, partially no soil layer at all, undulating, rests of grass, very dry	stony	grass, fallow

Parent Material	Stoniness	Layering	Infiltration Rate
	very high	gravelly top-soil above more homogenous base	85 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
2.1	10YR5/4	2.2	5YR4/8
USDA class: sandy clay	gravel 77.80	USDA class	gravel
	sand 48.24		sand
BulkDensity g/cm3	silt 26.56	BulkDensity g/cm3	silt
	(%) clay 25.20		(%) clay
pH 6.69	(%) Corg 0.73	pH 7.9	(%) Corg
	CEC 442.39		CEC
Sample No.	Munsell color	Sample No.	Munsell color
USDA class	gravel	USDA class	gravel
	sand		sand
BulkDensity g/cm3	silt	BulkDensity g/cm3	silt
	(%) clay		(%) clay
pH	(%) Corg	pH	(%) Corg
	CEC		CEC

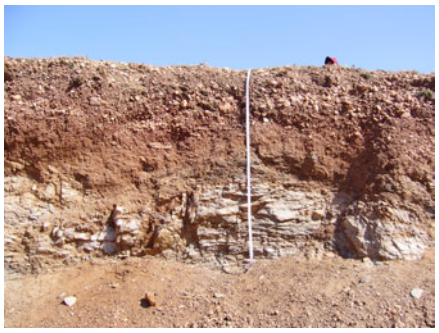
Profile

0-20 cm
light reddish-brown, gravelly ø >3cm (quartz), rooted
SAMPLE 2.1

20-50 cm
red, even more gravels ø 2cm, hustler path

50-80 cm
light red-orange flintic
SAMPLE 2.2

>80 cm
horizontally layered feldspathic bedrock with inclusion of large quartzites



Site No.	soil sampling · mod catchment · madhya pradesh · india
003	

Location	Date	UTM Coordinates	altitude (m)
Samoi, above lake near settlement	29/1/2006	X 0443356 Y 2505790	364

General Description

Position	Description	Surface Structure	Land Cover
middle of field with very low slope (E)	very dark-brown homogenous soil, no erosive patterns due to management, villagers describe it as “normal soil”	broken during culitvation, no cracks	cropped to gram (chickpea)

Parent Material	Stoniness	Layering	Infiltration Rate
	very few, quartz, sand and limestones	not stratified	90 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
3.1	10YR7/3	3.2	10YR5/3
USDA class: sandy loam	gravel	USDA class	gravel 35.37
	sand		sand 54.88
BulkDensity 2.00 g/cm3	silt	BulkDensity 1.49 g/cm3	silt 25.36
	(%) clay		(%) clay 19.76
pH 9.21	(%) Corg	pH 8.4	(%) Corg 1.63
	CEC		CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
3.3	10YR3/2	3.4	10YR8/2
USDA class	gravel	USDA class	gravel
	sand		sand
BulkDensity 1.48 g/cm3	silt	BulkDensity g/cm3	silt
	(%) clay		(%) clay
pH 8.92	(%) Corg	pH 9.12	(%) Corg
	CEC		CEC

Profile

0-20 cm
cultivated very dark with gravels, very dry
SAMPLE 3.2

20-55 cm
solidified loam, moist with larger gravels (quartz)
SAMPLE 3.3 (30)

55-100 cm
inclusion of sand- and limestones (50%), hence appears lighter and less solidified, well drained
SAMPLE 3.1 (80) and 3.4 (100)

Site No.	soil sampling · mod catchment · madhya pradesh · india
004	

Location	Date	UTM Coordinates	altitude (m)
Samoi, upper plain	29/1/2006	x 0443022 Y 2505519	371

General Description

Position	Description	Surface Structure	Land Cover
plain formed as large local depression between hill and small ridge, no slope	very (!) homogenous black soil, iridescent because of high clay content and presumably feldspathic origin, no gravels, villagers: “very strong soil”	cultivated, no erosion, no irrigation	mustard + soyabean as kharif, fallow in rabi

Parent Material	Stoniness	Layering	Infiltration Rate
apparently feldspar	very low	not layered	120 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
4.1	10YR4/2	4.2	10YR4/2
USDA class: clay	gravel	USDA class: clay	gravel 5.19
	sand 25.40		sand 28.44
BulkDensity 2.13 g/cm3	silt 16.28	BulkDensity 1.86 g/cm3	silt 20.36
	(%) clay 58.32		(%) clay 51.20
pH 9.12	(%) Corg 0.69	pH 8.85	(%) Corg 0.48
	CEC		CEC 728.37

Sample No.	Munsell color	Sample No.	Munsell color
4.3	5YR4/1		
USDA class: clay	gravel 8.48	USDA class	gravel
	sand 25.88		sand
BulkDensity g/cm3	silt 20.36	BulkDensity g/cm3	silt
	(%) clay 53.76		(%) clay
pH 8.41	(%) Corg 0.83	pH	(%) Corg
	CEC		CEC

Profile

0-20 cm
top soil cultivated
SAMPLE 4.3

20 cm
Infiltartion 100 mm/h
SAMPLE 4.2

>20 cm
very homogenous;

at 50 cm inclusions of sand (< 1 liter)

bedrock assumed at 3 meters as ± confined pahoehoe plume
SAMPLE 4.1 (100)

Site No.	soil sampling · mod catchment · madhya pradesh · india
006	

Location	Date	UTM Coordinates	altitude (m)
Kermal	31/1/2006	X 0443537 Y 2503297	389

General Description

Position	Description	Surface Structure	Land Cover
hole near edge of field, apparently dry well	existing outcrop; grassy, well wasn't used this year due to weak monsoon; bedrock consists of a feldspar and beyond pahoehoe; lime inclusions	fallow land, here not cultivated	grass

Parent Material	Stoniness	Layering	Infiltration Rate
montmorillonite, pahoehoe lava			mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
USDA class	gravel sand silt clay	USDA class	gravel sand silt clay
BulkDensity g/cm3		BulkDensity g/cm3	
pH	(%) Corg CEC	pH	(%) Corg CEC

Sample No.	Munsell color	Sample No.	Munsell color
USDA class	gravel sand silt clay	USDA class	gravel sand silt clay
BulkDensity g/cm3		BulkDensity g/cm3	
pH	(%) Corg CEC	pH	(%) Corg CEC

Profile

0-20 cm
light reddish brown, skelletal with cracks

20-50 cm
dark with gravels (quartz) rooting zone

50-300 cm
heavily weathered feldspathic bedrock with transfered limestone

>300 cm
slated pahoehoe with vertical standing layers

Site No.	soil sampling · mod catchment · madhya pradesh · india
007	

Location	Date	UTM Coordinates	altitude (m)
between Kermal and Chagola	31/1/2006	X 0442974 Y 2503423	390

General Description

Position	Description	Surface Structure	Land Cover
middle of field	very dark soil on top of bedrock plateau, many mixed gravels, dry and crumbly, compareable to sample X28 from hillside	cracks up to 25 cm (rooting zone), structure like on top of hillside	fallow, newly cultivated, maize until december

Parent Material	Stoniness	Layering	Infiltration Rate
pedogenesis of topsoil not at this site; proximity to hill	smaller gravels	topsoil - mixed gravely conglo-merate - bedrock	85 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
7.1	10YR3/1	7.2	7.5YR2/0
USDA class: loam	gravel 22.74	USDA class	gravel
	sand 43.12		sand
BulkDensity 1.52 g/cm3	silt 30.84	BulkDensity 1.79 g/cm3	silt
	(%) clay 26.04		(%) clay
pH 8.27	(%) Corg 0.65	pH 8.96	(%) Corg
	CEC 780.54		CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
7.3	10YR5/2		
USDA class: clay	gravel 52.13	USDA class	gravel
	sand 38.40		sand
BulkDensity 2.27 g/cm3	silt 18.28	BulkDensity g/cm3	silt
	(%) clay 43.32		(%) clay
pH 8.96	(%) Corg 0.44	pH	(%) Corg
	CEC		CEC

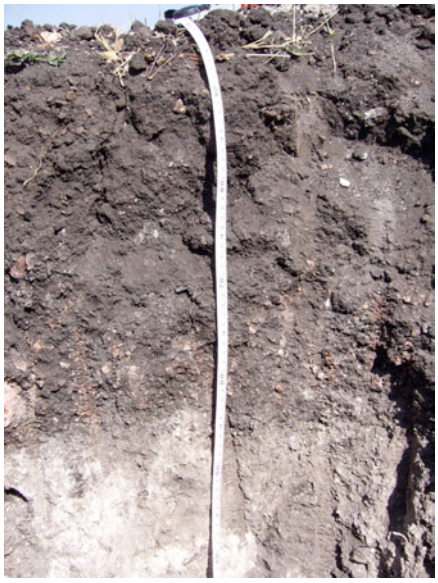
Profile

0-25 cm
black top-soil w/ cracks, small gravels (sandstone?)
SAMPLE 7.1

25-35 cm
mixed horizon with limestoe gravels; beyond (35-45 cm) band of red sandstone gravels ø 1-4cm
SAMPLE 7.2

45-85 cm
high content of limestone, conglomerated w/ red sandstones, pedgenesis
SAMPLE 7.3

>85 cm
bedrock of red metamorphic sandstone



Site No.	soil sampling · mod catchment · madhya pradesh · india
008	

Location	Date	UTM Coordinates	altitude (m)
Kermal	31/1/2006	x 0443812 Y 2503666	379

General Description

Position	Description	Surface Structure	Land Cover
local depression before gentle ridge	small well maintained fields, partially completely freed from gravels, dry rice as kharif	partially siltations, crusted top-soil	gram/fallow

Parent Material	Stoniness	Layering	Infiltration Rate
top-soil ? base from local feldspar/limestone	high	apparently transfered top-soil and locally generated base	80 mm/h

Laboratory Analysis

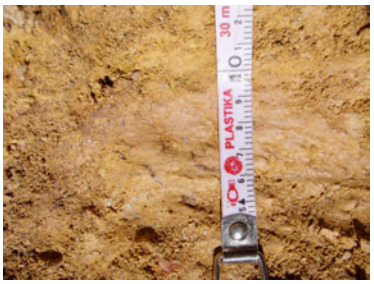
Sample No.	Munsell color	Sample No.	Munsell color
8.1	10YR8/6	8.2	7.5YR8/6
USDA class: loam BulkDensity: g/cm3	gravel 28.91 sand 40.44 silt 34.00 (%) clay 25.56	USDA class: loam BulkDensity: 2.49 g/cm3	gravel 35.90 sand 45.88 silt 36.36 (%) clay 17.76
pH 9.1	(%) Corg 0.71 CEC	pH 9.89	(%) Corg 0.80 CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
8.3	10YR3/2		
USDA class: clay BulkDensity: 1.36 g/cm3	gravel 1.42 sand 11.88 silt 32.36 (%) clay 55.76	USDA class BulkDensity: g/cm3	gravel sand silt (%) clay
pH 8.38	(%) Corg 0.75 CEC	pH	(%) Corg CEC

Profile

0-45 cm
black soil w/ high content of stones ø >10 cm
SAMPLE 8.3

45-90 cm
light yellowish very solid, iridescent when smoothed, limestone gravels
SAMPLE 8.1

>90 cm
reddish yellow fine base, apparently weathered montmorillonite, inclusions of gravels
SAMPLE 8.2



Site No.	soil sampling · mod catchment · madhya pradesh · india
009	

Location	Date	UTM Coordinates	altitude (m)
Kermal, lower village	1/2/2006	x 0444259 Y 2503342	370

General Description

Position	Description	Surface Structure	Land Cover
Gram field on gentle slope before small river bed	gravelly dark brown soil, traces of siltation infront of dam of river bed, very dry	broken, no erosion	grass/gram

Parent Material	Stoniness	Layering	Infiltration Rate
apparently topsoil transferred, base from local feldspar	very gravelly	due to genesis and cultivation	15 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
9.1	10YR6/4	9.2	10YR3/2
USDA class gravel sand BulkDensity 1.84 g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH 10.43 (%) Corg CEC		pH 9.13 (%) Corg CEC	
Sample No.	Munsell color	Sample No.	Munsell color
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH (%) Corg CEC		pH (%) Corg CEC	

Profile

0-10 cm
cultivated top-soil
dark brown, very dry

10-35 cm
solidified w/ large stones (quartz)
SAMPLE 9.2

35-55 cm
very gravelly horizon w/ ø 1 -10 cm (quartz +metamorphite)

>55 cm
weathered limestone base
SAMPLE 9.1 and 9.x

Site No.	soil sampling · mod catchment · madhya pradesh · india
010	

Location	Date	UTM Coordinates	altitude (m)
Kermal, dry well	1/2/2006	x 0443632 Y 2503292	376

General Description

Position	Description	Surface Structure	Land Cover
central of field, dry well, field in upper village, very slight slope	topsoil dry and dark, homogenous	small cracks	fallow

Parent Material	Stoniness	Layering	Infiltration Rate
	low	homogenous top-soil, thin developing soil on bedrock	140 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
10.1	7.5YR3/2	10.2	10YR8/2
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH 8.44 (%) Corg CEC		pH 9.78 (%) Corg CEC	
Sample No.	Munsell color	Sample No.	Munsell color
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH (%) Corg CEC		pH (%) Corg CEC	

Profile

0-60 cm
black, homogenous, small cracks

60-80 cm
mixed horizon with gravels ø 5cm

80-110 cm
devloping horizont, mixed topsoil and new feldspathic material, yellowish, solid

>110 cm
feldspathic bedrock 80° SW falling, NNW striking

Site No.	soil sampling · mod catchment · madhya pradesh · india
011	

Location	Date	UTM Coordinates	altitude (m)
Chagola, upper village	2/2/2006	X 0440783 Y 2502747	406

General Description

Position	Description	Surface Structure	Land Cover
undulating landscape at hill, on local ridge (±2m)	very dry, deserted. traces of grass. very shallow, prone to erosion. initial gullies nearby	deserted	fallow, none

Parent Material	Stoniness	Layering	Infiltration Rate
	rel. high	none	60 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
11.1	10YR6/6		
USDA class loam	**gravel** 40.53	**USDA class**	**gravel**
	sand 41.24		**sand**
BulkDensity 1.73 g/cm3	**silt** 39.56	**BulkDensity** g/cm3	**silt**
	(%) clay 19.20		**(%) clay**
pH 7.13	**(%) Corg** 0.24	**pH**	**(%) Corg**
	CEC		**CEC**

Sample No.	Munsell color	Sample No.	Munsell color
USDA class	**gravel**	**USDA class**	**gravel**
	sand		**sand**
BulkDensity g/cm3	**silt**	**BulkDensity** g/cm3	**silt**
	(%) clay		**(%) clay**
pH	**(%) Corg**	**pH**	**(%) Corg**
	CEC		**CEC**

Profile

0-15 cm
yellow - light brown fine soil, silt, rooted

>15 cm
bedrock of plume

Site No.	soil sampling · mod catchment · madhya pradesh · india
012	

General Description

Location	Date	UTM Coordinates	altitude (m)
Chagola	2/2/2006	X 0441322 Y 2502760	419

Position	Description	Surface Structure	Land Cover
on field, not recently cultivated, undulating surface	rel. loose red brownish soil, homogenous, small red sandstones	closed, no erosion	harvested, now fallow

Parent Material	Stoniness	Layering	Infiltration Rate
	rel. low	none	140 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
12.1	5YR3/4	12.2	5YR3/3
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH 8 (%) Corg CEC		pH 8.67 (%) Corg CEC	
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
12.w	7.5R6/4		
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH 8.45 (%) Corg CEC		pH (%) Corg CEC	

Profile

0-15 cm
loose red brown w/ gravels ø 2 cm
SAMPLE 12.1

15-50 cm
hard, dry (!) clay horizon w/ gravels, from 30 cm onward red sandstones

50-350 cm
rel. confined bedrock of unstructured lava ash

>350 cm
apparently fried red sandstone

Site No.	soil sampling · mod catchment · madhya pradesh · india
013	

Location	Date	UTM Coordinates	altitude (m)
Chagola	3/2/2006	x 0441022 Y 2502493	400

General Description

Position	Description	Surface Structure	Land Cover
edge of field near local depression	dark brown clay, rel. homogenous crumbly soil.	small cracks	gram

Parent Material	Stoniness	Layering	Infiltration Rate
apparently pahoeheo	low	none	150 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
13.1	10YR5/2	13.2	10YR3/2
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity 1.36 g/cm3 silt (%) clay	
pH 9.19 (%) Corg CEC		pH 8.91 (%) Corg CEC	
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
13.3	10YR3/2		
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH 8.95 (%) Corg CEC		pH (%) Corg CEC	

Profile

0-20 cm
broken dry top-soil, crumbly w/ small gravels
SAMPLE 13.2

20-70 cm
loamy dark and rel. moist, more solidified, small gravels ø <1cm

>70 cm
highly weathered bedrock, lava ash, limestone and sandstone, pedogenesis

Site No.	soil sampling · mod catchment · madhya pradesh · india
014	

Location	Date	UTM Coordinates	altitude (m)
Chagola	3/2/2006	X 0441829 Y 2503125	398

General Description

Position	Description	Surface Structure	Land Cover
plateau of fields, separated from village by small ridge	very homogenous clayic soil. very dark. complete field one system of wide and deep cracks, deep soil	cracked, no erosion patterns	pigeon pea

Parent Material	Stoniness	Layering	Infiltration Rate
	none	none	NaN mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
14.1	5YR2/1	14.2	10YR2/1
USDA class: clay	gravel 0.00	USDA class	gravel
	sand 20.88		sand
BulkDensity g/cm3	silt 15.36	BulkDensity g/cm3	silt
	(%) clay 63.76		(%) clay
pH 9.23	(%) Corg 0.76	pH 8.89	(%) Corg
	CEC		CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
USDA class	gravel	USDA class	gravel
	sand		sand
BulkDensity g/cm3	silt	BulkDensity g/cm3	silt
	(%) clay		(%) clay
pH	(%) Corg	pH	(%) Corg
	CEC		CEC

Profile

0-5 cm
crumbly dry surface

5-30 cm
dry black top-soil, roots, cracks 2 cm wide

30-60 cm (and apparently until 200 cm)
moist very clayic with few sand stone gravels, breaks in clods

Site No.	soil sampling · mod catchment · madhya pradesh · india
015	

Location	Date	UTM Coordinates	altitude (m)
between Chagola and Kermal	3/2/2006	X 0442085 Y 2503346	396

General Description

Position	Description	Surface Structure	Land Cover
edge of field to small river bed	brownish soil, apparently sedimented as debris material from hillside		harvested

Parent Material	Stoniness	Layering	Infiltration Rate
	med.	clearly layered	120 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
15.1	10YR4/4	15.2	10YR3/2
USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3	USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3
pH 8.25	(%) Corg / CEC	pH 9.54	(%) Corg / CEC
15.3	7.5YR5/2		
USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3	USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3
pH 9.21	(%) Corg / CEC	pH	(%) Corg / CEC

Profile

0-30 cm
debris material w/ gravels, layered, many roots

30-35 cm
limestone gravel band

35-65 cm
dark clayic horizon, few gravels
gravel band at 50 and 65 cm

65-90 cm
loamy horizon, yellowish in lower part

95 cm band of stones

95-120 cm
moist clay/loam, many roots

>120 cm bedrock

Site No.	soil sampling · mod catchment · madhya pradesh · india
016	

Location	Date	UTM Coordinates	altitude (m)
Kanjawani	4/2/2006	X 438803 Y 2503901	392

General Description

Position	Description	Surface Structure	Land Cover
field near Bhamchi river, edge between fields	dark soil with deep cracks, superficial siltation due to irrigation	cracked	gram, grass

Parent Material	Stoniness	Layering	Infiltration Rate
	low	only near surface red sandy/limy band	39 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
16.1	10YR3/2	16.2	7.5YR3/2
USDA class clay	**gravel** 7.36	**USDA class**	**gravel**
	sand 30.24		**sand**
BulkDensity 1.25 g/cm3	**silt** 24.56	**BulkDensity** 2.21 g/cm3	**silt**
	(%) clay 45.20		**(%) clay**
pH 8.07	**(%) Corg** 0.62	**pH** 8.66	**(%) Corg**
	CEC 750.11		**CEC**

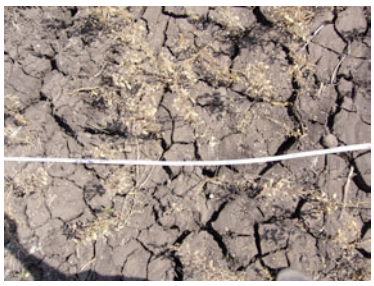
Sample No.	Munsell color	Sample No.	Munsell color
16.3	10YR3/2		
USDA class clay	**gravel** 0.00	**USDA class**	**gravel**
	sand 21.40		**sand**
BulkDensity 2.05 g/cm3	**silt** 25.00	**BulkDensity** g/cm3	**silt**
	(%) clay 53.60		**(%) clay**
pH 8.08	**(%) Corg** 0.45	**pH**	**(%) Corg**
	CEC		**CEC**

Profile

0-5 cm
black, rooting zone of grass
SAMPLE 16.1

5-15 cm
red w/ limy gravels

>15 cm
black clayic w/out stratification, 15-35 cm rel. dry, deeper clodlike structures and moist
SAMPLE 16.2 at 80 cm
SAMPLE 16.3 at 30 cm
SAMPLE 16.x at 30 cm



Site No.	soil sampling · mod catchment · madhya pradesh · india
017	

Location	Date	UTM Coordinates	altitude (m)
Kanjawani	4/2/2006	X 0439068 Y 2503912	398

General Description

Position	Description	Surface Structure	Land Cover
field on gently falling plateau near river	red - reddish brown soil, loose top-soil, increasing gravels with depth, cracks	cultivated	

Parent Material	Stoniness	Layering	Infiltration Rate
	rel. high	none	150* mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
17.1	5YR4/6	17.2	10YR3/4
USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3	USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3
pH 7.09	(%) Corg / CEC	pH 7.43	(%) Corg / CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
17.3	7.5YR6/6		
USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3	USDA class: gravel / sand / silt / clay (%)	BulkDensity g/cm3
pH 7.68	(%) Corg / CEC	pH	(%) Corg / CEC

Profile

0-20
reddish gravelly
SAMPLE 17.2
SAMPLE 17.1 (top-soil)

20-50 cm
solid skelletal horizon, yellowish
SAMPLE 17.3

>50 cm
layered highly weathered pahoehoe flow, similar to Chagola

*infiltration not measurable on field due to cracks, assessed on newly cultivated field nearby

Site No.	soil sampling · mod catchment · madhya pradesh · india
018	

Location	Date	UTM Coordinates	altitude (m)
Choti Kanjawani	4/2/2006	X 0439449 Y 2504087	401

General Description

Position	Description	Surface Structure	Land Cover
undulating, separated by gentle ridge from main Bhamchi basin	hills with shallow red soils, only in depressions darker and cultivated in rabi, highly degraded	deserted	none

Parent Material	Stoniness	Layering	Infiltration Rate
	high, no quartz	none	86 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
18.2	7.5YR5/4		
USDA class loam	**gravel** 0.83	**USDA class**	**gravel**
	sand 51.12		**sand**
BulkDensity g/cm3	**silt** 28.84	**BulkDensity** g/cm3	**silt**
	(%) clay 20.04		**(%) clay**
pH 6.73	**(%) Corg** 0.56	**pH**	**(%) Corg**
	CEC 401.09		**CEC**
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
USDA class	**gravel**	**USDA class**	**gravel**
	sand		**sand**
BulkDensity g/cm3	**silt**	**BulkDensity** g/cm3	**silt**
	(%) clay		**(%) clay**
pH	**(%) Corg**	**pH**	**(%) Corg**
	CEC		**CEC**

Profile

0-10 cm
very dry, crumbly, many gravels ø 0.5 - 10 cm

10-20 cm
more solid mixed horizon
SAMPLE 18.2

>20 cm
pahoehoe bedrock

Site No.	soil sampling · mod catchment · madhya pradesh · india
020	

Location	Date	UTM Coordinates	altitude (m)
Talavad	8/2/2006	x 0447194 Y 2491491	434

General Description

Position	Description	Surface Structure	Land Cover
field on plateau, very slightly undulating	reddish brown soil, one outcrop and one soil pit	deserted/grassy	cultivated/ grassy

Parent Material	Stoniness	Layering	Infiltration Rate
			mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
20.1	7.5YR4/4	20.2	7.5YR4/4
USDA class	gravel	USDA class	gravel
	sand		sand
BulkDensity g/cm3	silt	BulkDensity g/cm3	silt
	(%) clay		(%) clay
pH 7.73	(%) Corg	pH 7.34	(%) Corg
	CEC		CEC

Sample No.	Munsell color	Sample No.	Munsell color
20.3	10YR5/4	20.4	10YR4/4
USDA class	gravel 14.62	USDA class	gravel 7.09
sandy loam	sand 75.40	SC loam	sand 66.44
BulkDensity g/cm3	silt 9.00	BulkDensity 1.81 g/cm3	silt 10.36
	(%) clay 15.60		(%) clay 23.20
pH 7.28	(%) Corg 0.77	pH 7.82	(%) Corg 0.27
	CEC		CEC 329.35

Profile

0-30 cm
brown gravelly top-soil
SAMPLE 20.1

30-45 cm
reddish gravelly
SAMPLE 20.2

>45 cm bedrock pahoehoe
with lava ash
- - - - -

0-15 cm
light brown, loose, dry
SAMPLE 20.3

15-40 cm
reddish brown, dry
SAMPLE 20.4

>40 cm bedrock

Site No.	soil sampling · mod catchment · madhya pradesh · india
021	

Location	Date	UTM Coordinates	altitude (m)
Bhandakhapar	8/2/2006	X 0450843 Y 2494685	388

General Description

Position	Description	Surface Structure	Land Cover
field on very gentle slope	red soils, darker in depressions, there irrigated, very shallow soils, several top-soil samples in relative proximity	deserted	harvested

Parent Material	Stoniness	Layering	Infiltration Rate
	low	none	mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
21.1	10YR3/2	21.2	5YR4/6
USDA class: clay	gravel 0.00	USDA class: clay loam	gravel 0.00
	sand 30.40		sand 32.40
BulkDensity g/cm3	silt 25.28	BulkDensity g/cm3	silt 36.28
	(%) clay 44.32		(%) clay 31.32
pH 7.67	(%) Corg 0.58	pH 6.94	(%) Corg 0.57
	CEC		CEC

Sample No.	Munsell color	Sample No.	Munsell color
21.3	5YR4/4		
USDA class	gravel	USDA class	gravel
	sand		sand
BulkDensity g/cm3	silt	BulkDensity g/cm3	silt
	(%) clay		(%) clay
pH 6.78	(%) Corg	pH	(%) Corg
	CEC		CEC

Profile

very shallow soils ± 20 cm

SAMPLE 21.1
irrigated wheat field

SAMPLE 21.2
not irrigated, fallow, pigeon pea ias kharif

SAMPLE 21.3
not irrigated, fallow

Site No.	soil sampling · mod catchment · madhya pradesh · india
022	

Location	Date	UTM Coordinates	altitude (m)
Ban	9/2/2006	x 0450247 Y 2499342	366

General Description

Position	Description	Surface Structure	Land Cover
vegetable/rose garden, local depression	managed homogenous black soil, regularly irrigated, very small scale horticulture	newly cultivated	

Parent Material	Stoniness	Layering	Infiltration Rate
	low		150 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
22.1	10YR3/2	22.2	7.5YR2/0
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity 1.87 g/cm3 silt (%) clay	
pH 8.54 (%) Corg CEC		pH 9.3 (%) Corg CEC	
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
22.3	5YR4/2		
USDA class gravel sand BulkDensity g/cm3 silt (%) clay		USDA class gravel sand BulkDensity g/cm3 silt (%) clay	
pH 8.74 (%) Corg CEC		pH (%) Corg CEC	

Profile

0-15 cm
loose, sandy black top-soil, many roots

15-100 cm
black solid homogenous clay
---
in well nearby:
100-110 cm
gray gravel with soft material

110-150 cm
pahoehoe with lime conglomeration, crumbly

>150 cm
rel. confined bedrock

Site No.	soil sampling · mod catchment · madhya pradesh · india
023	

Location	Date	UTM Coordinates	altitude (m)
Ban, direction Puwala junction	9/2/2006	X 0450581 Y 2501015	372

General Description

Position	Description	Surface Structure	Land Cover
large plateau near road	crusted red soil, very dry, large area, deserted	traces of wind ersosion	none

Parent Material	Stoniness	Layering	Infiltration Rate
apparently feldspar and sandstone	low	none	85 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
23.1	5YR4/4	23.2	5YR4/6
USDA class: SC loam	gravel 7.01	USDA class: clay loam	gravel 9.16
	sand 46.40		sand 40.88
BulkDensity: 1.88 g/cm3	silt 27.00	BulkDensity: 1.82 g/cm3	silt 30.36
	(%) clay 26.60		(%) clay 28.76
pH 7.72	(%) Corg 0.34	pH 7.67	(%) Corg 0.78
	CEC		CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
23.3	5YR5/6		
USDA class: loam	gravel 9.46	USDA class	gravel
	sand 46.44		sand
BulkDensity: g/cm3	silt 28.36	BulkDensity: g/cm3	silt
	(%) clay 25.20		(%) clay
pH 7.01	(%) Corg 0.32	pH	(%) Corg
	CEC 372.83		CEC

Profile

0-15 cm
hard crust, apparently loose top soil taken by wind erosion, no cracks
SAMPLE 23.3

15-60 cm
slight bands of sandstone ø <0.5 cm, rooting zone, crumbly
SAMPLE 23.2

>60 cm
high content of larger gravels
SAMPLE 23.1

Site No.	soil sampling · mod catchment · madhya pradesh · india
024	

Location	Date	UTM Coordinates	altitude (m)
Uberao	10/2/2006	X 0446967 Y 2508948	346

General Description

Position	Description	Surface Structure	Land Cover
undulating landscape, on slope, upper portion	ocher soil with high content of weathered montmorillonite, huge amount of gravels (quartz)	stony	none

Parent Material	Stoniness	Layering	Infiltration Rate
feldspath	very high	accordign to genesis and erosion	120 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
24.1	7.5YR8/2	24.2	10YR6/4
USDA class: loam	gravel 32.79	USDA class: loam	gravel 27.02
	sand 34.88		sand 26.44
BulkDensity: 2.11 g/cm3	silt 43.36	BulkDensity: 2.00 g/cm3	silt 47.40
	(%) clay 21.76		(%) clay 26.16
pH 9.12	(%) Corg 0.30	pH 8.47	(%) Corg 0.53
	CEC		CEC
Sample No.	**Munsell color**	**Sample No.**	**Munsell color**
24.3	10YR6/4		
USDA class: loam	gravel 64.56	USDA class	gravel
	sand 46.44		sand
BulkDensity: g/cm3	silt 30.36	BulkDensity: g/cm3	silt
	(%) clay 23.20		(%) clay
pH 7.3	(%) Corg 0.68	pH	(%) Corg
	CEC 329.35		CEC

Profile

0-15 cm
gravelly top-soil, well mixed, quartz gravels ø 1-5 cm
SAMPLE 24.3

15-30 cm
less disturbed, more solidified, feldspaths
SAMPLE 24.2

>30 cm
pedogenesis of feldspaths, greasy appearence
SAMPLE 24.1 at 60 cm

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nearby outcrops of large feldspars/micas with enclosed quartz

Site No.	soil sampling · mod catchment · madhya pradesh · india
025	

Location	Date	UTM Coordinates	altitude (m)
Uberao, E of Mod river	10/2/2006	X 0445452 Y 2510129	343

General Description

Position	Description	Surface Structure	Land Cover
lokal depression between hills on plateau	crumbly red soil w/out cracks, in lower part less gravels, solid and rel. moist, soil homogenous	gravel	harvested cotton

Parent Material	Stoniness	Layering	Infiltration Rate
apparently feldspar	only on surface high	none	65 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
25.1	7.5YR6/6	25.2	5YR6/6
USDA class: clay loam	gravel 0.00	USDA class	gravel
	sand 27.44		sand
BulkDensity 1.54 g/cm3	silt 34.00	BulkDensity g/cm3	silt
	(%) clay 38.56		(%) clay
pH 7.78	(%) Corg 0.30	pH 7.53	(%) Corg
	CEC 279.35		CEC

Sample No.	Munsell color	Sample No.	Munsell color
25.3	5YR6/4		
USDA class: loam	gravel 23.24	USDA class	gravel
	sand 39.24		sand
BulkDensity g/cm3	silt 36.56	BulkDensity g/cm3	silt
	(%) clay 24.20		(%) clay
pH 6.8	(%) Corg 0.48	pH	(%) Corg
	CEC 215.76		CEC

Profile

0-15 cm
dry, mixed, gravel, few roots
SAMPLE 25.3

>15 cm
rel. solid red soil w/ few gravels
SAMPLE 25.2 at 30 cm
SAMPLE 25.1 at 55 cm

Site No.	soil sampling · mod catchment · madhya pradesh · india
026	

Location	Date	UTM Coordinates	altitude (m)
Pitol	18/2/2006	X 0445201 Y 2519445	332

General Description

Position	Description	Surface Structure	Land Cover
field with gentle slope (SW)	homogenous light red-brown soil, farmer explains: “if there is water, the soil is good”	cultivated	none, only kharif

Parent Material	Stoniness	Layering	Infiltration Rate
apparently feldspar	rel. low	none	90 mm/h

Laboratory Analysis

Sample No.	Munsell color	Sample No.	Munsell color
26.1	10YR6/4	26.2	10YR5/4
USDA class clay loam	**gravel** 0.00	**USDA class** clay loam	**gravel** 8.66
	sand 30.44		**sand** 34.40
BulkDensity 1.97 g/cm3	**silt** 30.00	**BulkDensity** 1.71 g/cm3	**silt** 32.28
	(%) clay 39.56		**(%) clay** 33.32
pH 8.55	**(%) Corg** 0.57	**pH** 8.91	**(%) Corg** 0.59
	CEC		**CEC** 414.13

Sample No.	Munsell color	Sample No.	Munsell color
26.3	10YR6/4		
USDA class loam	**gravel** 14.21	**USDA class**	**gravel**
	sand 41.12		**sand**
BulkDensity g/cm3	**silt** 33.84	**BulkDensity** g/cm3	**silt**
	(%) clay 25.04		**(%) clay**
pH 7.49	**(%) Corg** 0.37	**pH**	**(%) Corg**
	CEC 501.09		**CEC**

Profile

0-15 cm
cultivated loose silty top-soil w/ few gravels
SAMPLE 26.3

15-60 cm
very homogenous, clayic soil, suprisingly rel. moist, no gravel
SAMPLE 26.2

>60 cm
very feldspathic, pedogenesis of bedrock