

## **RIV-T-10    Estimation of Soil Loss in Sub-basins**

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## 1. Estimation of Soil Losses in Sub-basin L20

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topo-graphic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	7,000	0.032	0.75	0.125	1.00	20.88	0.0	0.18	0	0
		terracing	4.0	30	7,000	0.032	0.41	0.125	0.10	1.14		0.02	0	0
	Pasture-2	none	4.0	100	7,000	0.032	0.75	0.015	1.00	2.51	1,436.8	0.20	28,736	72,008
	Upland crop	none	4.0	50	7,000	0.032	0.53	0.250	1.00	29.53		0.18	2,668	78,779
		terracing	4.0	30	7,000	0.032	0.41	0.250	0.10	2.29		0.02	296	678
	Forestation	none	4.0	100	7,000	0.032	0.75	0.100	1.00	16.71	51.3	0.20	1,026	17,140
	Natural forest	none	4.0	100	7,000	0.032	0.75	0.001	1.00	0.17	496.1	0.20	9,922	1,658
5-15%	Pasture-1	none	10.0	100	7,000	0.032	2.49	0.125	1.00	69.63	0.0	0.90	0	0
		terracing	10.0	20	7,000	0.032	1.11	0.125	0.12	3.74		0.10	0	0
	Pasture-2	none	10.0	100	7,000	0.032	2.49	0.015	1.00	8.36	91.6	1.00	9,160	76,534
	Upland crop	none	10.0	50	7,000	0.032	1.76	0.250	1.00	98.47	9.2	0.90	828	81,531
		terracing	10.0	20	7,000	0.032	1.11	0.250	0.12	7.47		0.10	92	688
	Forestation	none	10.0	100	7,000	0.032	2.49	0.100	1.00	55.70	1.8	1.00	180	10,026
	Natural forest	none	10.0	100	7,000	0.032	2.49	0.001	1.00	0.56	60.3	1.00	6,030	3,359
15-25%	Pasture-1	none	20.0	100	7,000	0.032	7.60	0.125	1.00	212.81	0.0	0.90	0	0
		terracing	20.0	15	7,000	0.032	2.94	0.125	0.16	13.19		0.10	0	0
	Pasture-2	none	20.0	100	7,000	0.032	7.60	0.015	1.00	25.54	0.0	1.00	0	0
	Upland crop	none	20.0	50	7,000	0.032	5.37	0.250	1.00	300.96	0.0	0.90	0	0
		terracing	20.0	15	7,000	0.032	2.94	0.250	0.16	26.37		0.10	0	0
	Forestation	none	20.0	100	7,000	0.032	7.60	0.100	1.00	170.25	0.0	1.00	0	0
	Natural forest	none	20.0	100	7,000	0.032	7.60	0.001	1.00	1.70	0.0	1.00	0	0
s>25%	Pasture-1	none	32.5	100	7,000	0.032	17.88	0.125	1.00	500.68	0.0	1.00	0	0
	Pasture-2	none	32.5	100	7,000	0.032	17.88	0.015	1.00	60.08	12.4	1.00	1,240	74,501
	Forestation	none	32.5	100	7,000	0.032	17.88	0.100	1.00	400.54	1.7	1.00	170	68,092
	Natural forest	none	32.5	100	7,000	0.032	17.88	0.001	1.00	4.01	25.3	1.00	2,530	10,134
Total													62,878	495,126

Source: JICA Study Team

Average = 7.9 ton/ha/year

## 2. Estimation of Soil Losses in Sub-basin L30-1

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	6,000	0.032	0.75	0.125	1.00	17.90	13.2	0.18	238	4,253
		terracing	4.0	30	6,000	0.032	0.41	0.125	0.10	0.98		0.02	26	26
	Pasture-2	none	4.0	100	6,000	0.032	0.75	0.015	1.00	2.15	64.7	0.20	1,294	2,779
	Upland crop	none	4.0	50	6,000	0.032	0.53	0.250	1.00	25.31		0.18	36	911
		terracing	4.0	30	6,000	0.032	0.41	0.250	0.10	1.96	2.0	0.02	4	8
	Forestation	none	4.0	100	6,000	0.032	0.75	0.100	1.00	14.32		0.20	36	515
	Natural forest	none	4.0	100	6,000	0.032	0.75	0.001	1.00	0.14	37.6	0.20	752	108
5-15%	Pasture-1	none	10.0	100	6,000	0.032	2.49	0.125	1.00	59.68	168.8	0.90	15,192	906,660
		terracing	10.0	20	6,000	0.032	1.11	0.125	0.12	3.20		0.10	1,688	5,406
	Pasture-2	none	10.0	100	6,000	0.032	2.49	0.015	1.00	7.16	1,502.0	1.00	150,200	1,075,674
	Upland crop	none	10.0	50	6,000	0.032	1.76	0.250	1.00	84.40		0.90	5,139	433,734
		terracing	10.0	20	6,000	0.032	1.11	0.250	0.12	6.41	57.1	0.10	571	3,658
	Forestation	none	10.0	100	6,000	0.032	2.49	0.100	1.00	47.74		1.00	1,310	62,545
	Natural forest	none	10.0	100	6,000	0.032	2.49	0.001	1.00	0.48	342.7	1.00	34,270	16,362
15-25%	Pasture-1	none	20.0	100	6,000	0.032	7.60	0.125	1.00	182.41	92.5	0.90	8,325	1,518,561
		terracing	20.0	15	6,000	0.032	2.94	0.125	0.16	11.30		0.10	925	10,456
	Pasture-2	none	20.0	100	6,000	0.032	7.60	0.015	1.00	21.89	570.5	1.00	57,050	1,248,777
	Upland crop	none	20.0	50	6,000	0.032	5.37	0.250	1.00	257.97		0.90	2,313	596,676
		terracing	20.0	15	6,000	0.032	2.94	0.250	0.16	22.61	25.7	0.10	257	5,810
	Forestation	none	20.0	100	6,000	0.032	7.60	0.100	1.00	145.93		1.00	800	116,742
	Natural forest	none	20.0	100	6,000	0.032	7.60	0.001	1.00	1.46	254.8	1.00	25,480	37,182
s>25%	Pasture-1	none	32.5	100	6,000	0.032	17.88	0.125	1.00	429.15	10.4	1.00	1,040	446,318
	Pasture-2	none	32.5	100	6,000	0.032	17.88	0.015	1.00	51.50	107.8	1.00	10,780	555,151
	Forestation	none	32.5	100	6,000	0.032	17.88	0.100	1.00	343.32	0.7	1.00	70	24,033
	Natural forest	none	32.5	100	6,000	0.032	17.88	0.001	1.00	3.43	19.5	1.00	1,950	6,695
Total													319,746	7,079,040

Source: JICA Study Team

Average = 22.1 ton/ha/year

### 3. Estimation of Soil Losses in Sub-basin L30-2

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	6,000	0.032	0.75	0.125	1.00	17.90	0.0	0.18	0	0
		terracing	4.0	30	6,000	0.032	0.41	0.125	0.10	0.98		0.02	0	0
	Pasture-2	none	4.0	100	6,000	0.032	0.75	0.015	1.00	2.15	0.0	0.20	0	0
	Upland crop	none	4.0	50	6,000	0.032	0.53	0.250	1.00	25.31	0.0	0.18	0	0
		terracing	4.0	30	6,000	0.032	0.41	0.250	0.10	1.96		0.02	0	0
	Forestation	none	4.0	100	6,000	0.032	0.75	0.100	1.00	14.32	0.0	0.20	0	0
	Natural forest	none	4.0	100	6,000	0.032	0.75	0.001	1.00	0.14	0.0	0.20	0	0
5-15%	Pasture-1	none	10.0	100	6,000	0.032	2.49	0.125	1.00	59.68	37.9	0.90	3,411	203,569
		terracing	10.0	20	6,000	0.032	1.11	0.125	0.12	3.20		0.10	379	1,214
	Pasture-2	none	10.0	100	6,000	0.032	2.49	0.015	1.00	7.16	276.0	1.00	27,600	197,661
	Upland crop	none	10.0	50	6,000	0.032	1.76	0.250	1.00	84.40	23.4	0.90	2,106	177,747
		terracing	10.0	20	6,000	0.032	1.11	0.250	0.12	6.41		0.10	234	1,499
	Forestation	none	10.0	100	6,000	0.032	2.49	0.100	1.00	47.74	8.5	1.00	850	40,582
	Natural forest	none	10.0	100	6,000	0.032	2.49	0.001	1.00	0.48	158.7	1.00	15,870	7,577
15-25%	Pasture-1	none	20.0	100	6,000	0.032	7.60	0.125	1.00	182.41	83.0	0.90	7,470	1,362,601
		terracing	20.0	15	6,000	0.032	2.94	0.125	0.16	11.30		0.10	830	9,382
	Pasture-2	none	20.0	100	6,000	0.032	7.60	0.015	1.00	21.89	827.3	1.00	82,730	1,810,891
	Upland crop	none	20.0	50	6,000	0.032	5.37	0.250	1.00	257.97	52.7	0.90	4,743	1,223,535
		terracing	20.0	15	6,000	0.032	2.94	0.250	0.16	22.61		0.10	527	11,914
	Forestation	none	20.0	100	6,000	0.032	7.60	0.100	1.00	145.93	23.8	1.00	2,380	347,308
	Natural forest	none	20.0	100	6,000	0.032	7.60	0.001	1.00	1.46	564.4	1.00	56,440	82,362
s>25%	Pasture-1	none	32.5	100	6,000	0.032	17.88	0.125	1.00	429.15	0.0	1.00	0	0
	Pasture-2	none	32.5	100	6,000	0.032	17.88	0.015	1.00	51.50	0.0	1.00	0	0
	Forestation	none	32.5	100	6,000	0.032	17.88	0.100	1.00	343.32	0.0	1.00	0	0
	Natural forest	none	32.5	100	6,000	0.032	17.88	0.001	1.00	3.43	0.0	1.00	0	0
Total													205,570	5,477,842

Source: JICA Study Team

Average = 26.6 ton/ha/year

#### 4. Estimation of Soil Losses in Sub-basin L30-3

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topo-graphic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	6,000	0.032	0.75	0.125	1.00	17.90	12.9	0.16	206	3,694
		terracing	4.0	30	6,000	0.032	0.41	0.125	0.10	0.98		0.04	52	51
	Pasture-2	none	4.0	100	6,000	0.032	0.75	0.015	1.00	2.15	317.0	0.20	6,340	13,618
	Upland crop	none	4.0	50	6,000	0.032	0.53	0.250	1.00	25.31	95.4	0.16	1,526	38,638
		terracing	4.0	30	6,000	0.032	0.41	0.250	0.10	1.96		0.04	382	748
	Forestation	none	4.0	100	6,000	0.032	0.75	0.100	1.00	14.32	20.6	0.20	412	5,899
	Natural forest	none	4.0	100	6,000	0.032	0.75	0.001	1.00	0.14	257.6	0.20	5,152	738
5-15%	Pasture-1	none	10.0	100	6,000	0.032	2.49	0.125	1.00	59.68	164.4	0.80	13,152	784,913
		terracing	10.0	20	6,000	0.032	1.11	0.125	0.12	3.20		0.20	3,288	10,531
	Pasture-2	none	10.0	100	6,000	0.032	2.49	0.015	1.00	7.16	1,378.7	1.00	137,870	987,372
	Upland crop	none	10.0	50	6,000	0.032	1.76	0.250	1.00	84.40	560.7	0.80	44,856	3,785,865
		terracing	10.0	20	6,000	0.032	1.11	0.250	0.12	6.41		0.20	11,214	71,832
	Forestation	none	10.0	100	6,000	0.032	2.49	0.100	1.00	47.74	190.0	1.00	19,000	907,138
	Natural forest	none	10.0	100	6,000	0.032	2.49	0.001	1.00	0.48	1,294.3	1.00	129,430	61,795
15-25%	Pasture-1	none	20.0	100	6,000	0.032	7.60	0.125	1.00	182.41	89.3	0.80	7,144	1,303,135
		terracing	20.0	15	6,000	0.032	2.94	0.125	0.16	11.30		0.20	1,786	20,188
	Pasture-2	none	20.0	100	6,000	0.032	7.60	0.015	1.00	21.89	712.2	1.00	71,220	1,558,947
	Upland crop	none	20.0	50	6,000	0.032	5.37	0.250	1.00	257.97	286.9	0.80	22,952	5,920,844
		terracing	20.0	15	6,000	0.032	2.94	0.250	0.16	22.61		0.20	5,738	129,719
	Forestation	none	20.0	100	6,000	0.032	7.60	0.100	1.00	145.93	183.1	1.00	18,310	2,671,938
	Natural forest	none	20.0	100	6,000	0.032	7.60	0.001	1.00	1.46	894.1	1.00	89,410	130,474
s>25%	Pasture-1	none	32.5	100	6,000	0.032	17.88	0.125	1.00	429.15	22.5	1.00	2,250	965,592
	Pasture-2	none	32.5	100	6,000	0.032	17.88	0.015	1.00	51.50	522.9	1.00	52,290	2,692,842
	Forestation	none	32.5	100	6,000	0.032	17.88	0.100	1.00	343.32	58.6	1.00	5,860	2,011,864
	Natural forest	none	32.5	100	6,000	0.032	17.88	0.001	1.00	3.43	427.6	1.00	42,760	146,804
Total													692,600	24,225,179

Source: JICA Study Team

Average = 35.0 ton/ha/year

## 5. Estimation of Soil Losses in Sub-basin L30-4

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	6,000	0.032	0.75	0.125	1.00	17.90	0.0	0.15	0	0
		terracing	4.0	30	6,000	0.032	0.41	0.125	0.10	0.98		0.05	0	0
	Pasture-2	none	4.0	100	6,000	0.032	0.75	0.015	1.00	2.15	404.6	0.20	8,092	17,381
	Upland crop	none	4.0	50	6,000	0.032	0.53	0.250	1.00	25.31		0.15	1,970	49,854
		terracing	4.0	30	6,000	0.032	0.41	0.250	0.10	1.96		0.05	657	1,287
	Forestation	none	4.0	100	6,000	0.032	0.75	0.100	1.00	14.32	6.5	0.20	130	1,861
	Natural forest	none	4.0	100	6,000	0.032	0.75	0.001	1.00	0.14	302.1	0.20	6,042	865
5-15%	Pasture-1	none	10.0	100	6,000	0.032	2.49	0.125	1.00	59.68	0.0	0.75	0	0
		terracing	10.0	20	6,000	0.032	1.11	0.125	0.12	3.20		0.25	0	0
	Pasture-2	none	10.0	100	6,000	0.032	2.49	0.015	1.00	7.16	530.8	1.00	53,080	380,138
	Upland crop	none	10.0	50	6,000	0.032	1.76	0.250	1.00	84.40		0.75	6,360	536,787
		terracing	10.0	20	6,000	0.032	1.11	0.250	0.12	6.41	84.8	0.25	2,120	13,580
	Forestation	none	10.0	100	6,000	0.032	2.49	0.100	1.00	47.74	32.5	1.00	3,250	155,168
	Natural forest	none	10.0	100	6,000	0.032	2.49	0.001	1.00	0.48	454.6	1.00	45,460	21,704
15-25%	Pasture-1	none	20.0	100	6,000	0.032	7.60	0.125	1.00	182.41	0.0	0.75	0	0
		terracing	20.0	15	6,000	0.032	2.94	0.125	0.16	11.30		0.25	0	0
	Pasture-2	none	20.0	100	6,000	0.032	7.60	0.015	1.00	21.89	336.6	1.00	33,660	736,790
	Upland crop	none	20.0	50	6,000	0.032	5.37	0.250	1.00	257.97		0.75	3,398	876,441
		terracing	20.0	15	6,000	0.032	2.94	0.250	0.16	22.61	45.3	0.25	1,133	25,602
	Forestation	none	20.0	100	6,000	0.032	7.60	0.100	1.00	145.93	43.0	1.00	4,300	627,490
	Natural forest	none	20.0	100	6,000	0.032	7.60	0.001	1.00	1.46	619.5	1.00	61,950	90,402
s>25%	Pasture-1	none	32.5	100	6,000	0.032	17.88	0.125	1.00	429.15	0.0	1.00	0	0
	Pasture-2	none	32.5	100	6,000	0.032	17.88	0.015	1.00	51.50	13.2	1.00	1,320	67,978
	Forestation	none	32.5	100	6,000	0.032	17.88	0.100	1.00	343.32	0.9	1.00	90	30,899
	Natural forest	none	32.5	100	6,000	0.032	17.88	0.001	1.00	3.43	10.6	1.00	1,060	3,639
Total													234,070	3,637,866

Source: JICA Study Team

Average = 15.5 ton/ha/year

## 6. Estimation of Soil Losses in Sub-basin L30-5

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	6,000	0.032	0.75	0.125	1.00	17.90	0.0	0.15	0	0
		terracing	4.0	30	6,000	0.032	0.41	0.125	0.10	0.98		0.05	0	0
	Pasture-2	none	4.0	100	6,000	0.032	0.75	0.015	1.00	2.15	411.4	0.20	8,228	17,673
	Upland crop	none	4.0	50	6,000	0.032	0.53	0.250	1.00	25.31		0.15	1,434	36,299
		terracing	4.0	30	6,000	0.032	0.41	0.250	0.10	1.96		0.05	478	937
	Forestation	none	4.0	100	6,000	0.032	0.75	0.100	1.00	14.32	12.8	0.20	256	3,666
	Natural forest	none	4.0	100	6,000	0.032	0.75	0.001	1.00	0.14	148.3	0.20	2,966	425
5-15%	Pasture-1	none	10.0	100	6,000	0.032	2.49	0.125	1.00	59.68	0.0	0.75	0	0
		terracing	10.0	20	6,000	0.032	1.11	0.125	0.12	3.20		0.25	0	0
	Pasture-2	none	10.0	100	6,000	0.032	2.49	0.015	1.00	7.16	113.2	1.00	11,320	81,069
	Upland crop	none	10.0	50	6,000	0.032	1.76	0.250	1.00	84.40		0.75	2,925	246,871
		terracing	10.0	20	6,000	0.032	1.11	0.250	0.12	6.41		0.25	975	6,245
	Forestation	none	10.0	100	6,000	0.032	2.49	0.100	1.00	47.74	13.8	1.00	1,380	65,887
	Natural forest	none	10.0	100	6,000	0.032	2.49	0.001	1.00	0.48	195.9	1.00	19,590	9,353
15-25%	Pasture-1	none	20.0	100	6,000	0.032	7.60	0.125	1.00	182.41	0.0	0.75	0	0
		terracing	20.0	15	6,000	0.032	2.94	0.125	0.16	11.30		0.25	0	0
	Pasture-2	none	20.0	100	6,000	0.032	7.60	0.015	1.00	21.89	62.2	1.00	6,220	136,151
	Upland crop	none	20.0	50	6,000	0.032	5.37	0.250	1.00	257.97		0.75	840	216,692
		terracing	20.0	15	6,000	0.032	2.94	0.250	0.16	22.61		0.25	280	6,330
	Forestation	none	20.0	100	6,000	0.032	7.60	0.100	1.00	145.93	13.8	1.00	1,380	201,380
	Natural forest	none	20.0	100	6,000	0.032	7.60	0.001	1.00	1.46	180.2	1.00	18,020	26,296
s>25%	Pasture-1	none	32.5	100	6,000	0.032	17.88	0.125	1.00	429.15	0.0	1.00	0	0
	Pasture-2	none	32.5	100	6,000	0.032	17.88	0.015	1.00	51.50	3.6	1.00	360	18,539
	Forestation	none	32.5	100	6,000	0.032	17.88	0.100	1.00	343.32	0.4	1.00	40	13,733
	Natural forest	none	32.5	100	6,000	0.032	17.88	0.001	1.00	3.43	7.9	1.00	790	2,712
Total													77,482	1,090,258

Source: JICA Study Team

Average = 14.1 ton/ha/year

## 7. Estimation of Soil Losses in Sub-basin L30-6

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	5,750	0.032	0.75	0.125	1.00	17.15	0.0	0.15	0	0
		terracing	4.0	30	5,750	0.032	0.41	0.125	0.10	0.94		0.05	0	0
	Pasture-2	none	4.0	100	5,750	0.032	0.75	0.015	1.00	2.06	30.5	0.20	610	1,256
	Upland crop	none	4.0	50	5,750	0.032	0.53	0.250	1.00	24.26		0.15	2,156	52,289
		terracing	4.0	30	5,750	0.032	0.41	0.250	0.10	1.88		0.05	719	1,350
	Forestation	none	4.0	100	5,750	0.032	0.75	0.100	1.00	13.72	0.5	0.20	10	137
	Natural forest	none	4.0	100	5,750	0.032	0.75	0.001	1.00	0.14	44.2	0.20	884	121
5-15%	Pasture-1	none	10.0	100	5,750	0.032	2.49	0.125	1.00	57.19	0.0	0.75	0	0
		terracing	10.0	20	5,750	0.032	1.11	0.125	0.12	3.07		0.25	0	0
	Pasture-2	none	10.0	100	5,750	0.032	2.49	0.015	1.00	6.86	80.2	1.00	8,020	55,043
	Upland crop	none	10.0	50	5,750	0.032	1.76	0.250	1.00	80.88		0.75	8,505	687,916
		terracing	10.0	20	5,750	0.032	1.11	0.250	0.12	6.14		0.25	2,835	17,403
	Forestation	none	10.0	100	5,750	0.032	2.49	0.100	1.00	45.75	13.3	1.00	1,330	60,854
	Natural forest	none	10.0	100	5,750	0.032	2.49	0.001	1.00	0.46	147.9	1.00	14,790	6,767
15-25%	Pasture-1	none	20.0	100	5,750	0.032	7.60	0.125	1.00	174.81	0.0	0.75	0	0
		terracing	20.0	15	5,750	0.032	2.94	0.125	0.16	10.83		0.25	0	0
	Pasture-2	none	20.0	100	5,750	0.032	7.60	0.015	1.00	20.98	73.7	1.00	7,370	154,601
	Upland crop	none	20.0	50	5,750	0.032	5.37	0.250	1.00	247.22		0.75	3,413	843,631
		terracing	20.0	15	5,750	0.032	2.94	0.250	0.16	21.67		0.25	1,138	24,644
	Forestation	none	20.0	100	5,750	0.032	7.60	0.100	1.00	139.85	12.7	1.00	1,270	177,606
	Natural forest	none	20.0	100	5,750	0.032	7.60	0.001	1.00	1.40	95.7	1.00	9,570	13,383
s>25%	Pasture-1	none	32.5	100	5,750	0.032	17.88	0.125	1.00	411.27	0.0	1.00	0	0
	Pasture-2	none	32.5	100	5,750	0.032	17.88	0.015	1.00	49.35	82.9	1.00	8,290	409,132
	Forestation	none	32.5	100	5,750	0.032	17.88	0.100	1.00	329.02	15.8	1.00	1,580	519,846
	Natural forest	none	32.5	100	5,750	0.032	17.88	0.001	1.00	3.29	55.4	1.00	5,540	18,228
Total													78,028	3,044,207

Source: JICA Study Team

Average = 39.0 ton/ha/year



## 8. Estimation of Soil Losses in Sub-basin L40-4

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topo-graphic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	5,000	0.032	0.75	0.125	1.00	14.92	95.1	0.18	1,712	25,533
		terracing	4.0	30	5,000	0.032	0.41	0.125	0.10	0.82		0.02	190	155
	Pasture-2	none	4.0	100	5,000	0.032	0.75	0.015	1.00	1.79	868.6	0.20	17,372	31,094
	Upland crop	none	4.0	50	5,000	0.032	0.53	0.250	1.00	21.09	40.7	0.18	733	15,454
		terracing	4.0	30	5,000	0.032	0.41	0.250	0.10	1.63		0.02	81	133
	Forestation	none	4.0	100	5,000	0.032	0.75	0.100	1.00	11.93	13.7	0.20	274	3,270
	Natural forest	none	4.0	100	5,000	0.032	0.75	0.001	1.00	0.12	201.8	0.20	4,036	482
5-15%	Pasture-1	none	10.0	100	5,000	0.032	2.49	0.125	1.00	49.73	279.5	0.90	25,155	1,251,044
		terracing	10.0	20	5,000	0.032	1.11	0.125	0.12	2.67		0.10	2,795	7,460
	Pasture-2	none	10.0	100	5,000	0.032	2.49	0.015	1.00	5.97	1,958.2	1.00	195,820	1,168,656
	Upland crop	none	10.0	50	5,000	0.032	1.76	0.250	1.00	70.33	107.6	0.90	9,684	681,111
		terracing	10.0	20	5,000	0.032	1.11	0.250	0.12	5.34		0.10	1,076	5,744
	Forestation	none	10.0	100	5,000	0.032	2.49	0.100	1.00	39.79	53.1	1.00	5,310	211,268
	Natural forest	none	10.0	100	5,000	0.032	2.49	0.001	1.00	0.40	778.3	1.00	77,830	30,966
15-25%	Pasture-1	none	20.0	100	5,000	0.032	7.60	0.125	1.00	152.01	80.0	0.90	7,200	1,094,459
		terracing	20.0	15	5,000	0.032	2.94	0.125	0.16	9.42		0.10	800	7,536
	Pasture-2	none	20.0	100	5,000	0.032	7.60	0.015	1.00	18.24	440.5	1.00	44,050	803,515
	Upland crop	none	20.0	50	5,000	0.032	5.37	0.250	1.00	214.97	31.1	0.90	2,799	601,707
		terracing	20.0	15	5,000	0.032	2.94	0.250	0.16	18.84		0.10	311	5,859
	Forestation	none	20.0	100	5,000	0.032	7.60	0.100	1.00	121.61	15.3	1.00	1,530	186,058
	Natural forest	none	20.0	100	5,000	0.032	7.60	0.001	1.00	1.22	166.5	1.00	16,650	20,247
s>25%	Pasture-1	none	32.5	100	5,000	0.032	17.88	0.125	1.00	357.63	0.0	1.00	0	0
	Pasture-2	none	32.5	100	5,000	0.032	17.88	0.015	1.00	42.92	0.0	1.00	0	0
	Forestation	none	32.5	100	5,000	0.032	17.88	0.100	1.00	286.10	0.0	1.00	0	0
	Natural forest	none	32.5	100	5,000	0.032	17.88	0.001	1.00	2.86	0.0	1.00	0	0
Total													415,408	6,151,749

Source: JICA Study Team

Average = 14.8 ton/ha/year

## 9. Estimation of Soil Losses in Sub-basin L40-5

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	4,750	0.032	0.75	0.125	1.00	14.17	23.5	0.18	423	5,994
		terracing	4.0	30	4,750	0.032	0.41	0.125	0.10	0.78		0.02	47	36
	Pasture-2	none	4.0	100	4,750	0.032	0.75	0.015	1.00	1.70	1,267.9	0.20	25,358	43,119
	Upland crop	none	4.0	50	4,750	0.032	0.53	0.250	1.00	20.04		0.18	2,380	47,686
		terracing	4.0	30	4,750	0.032	0.41	0.250	0.10	1.55		0.02	264	410
	Forestation	none	4.0	100	4,750	0.032	0.75	0.100	1.00	11.34	5.6	0.20	112	1,270
	Natural forest	none	4.0	100	4,750	0.032	0.75	0.001	1.00	0.11	74.4	0.20	1,488	169
5-15%	Pasture-1	none	10.0	100	4,750	0.032	2.49	0.125	1.00	47.25	70.3	0.90	6,327	298,930
		terracing	10.0	20	4,750	0.032	1.11	0.125	0.12	2.54		0.10	703	1,782
	Pasture-2	none	10.0	100	4,750	0.032	2.49	0.015	1.00	5.67	557.8	1.00	55,780	316,251
	Upland crop	none	10.0	50	4,750	0.032	1.76	0.250	1.00	66.82		0.90	11,970	799,799
		terracing	10.0	20	4,750	0.032	1.11	0.250	0.12	5.07		0.10	1,330	6,745
	Forestation	none	10.0	100	4,750	0.032	2.49	0.100	1.00	37.80	13.9	1.00	1,390	52,538
	Natural forest	none	10.0	100	4,750	0.032	2.49	0.001	1.00	0.38	195.4	1.00	19,540	7,386
15-25%	Pasture-1	none	20.0	100	4,750	0.032	7.60	0.125	1.00	144.41	30.2	0.90	2,718	392,500
		terracing	20.0	15	4,750	0.032	2.94	0.125	0.16	8.95		0.10	302	2,702
	Pasture-2	none	20.0	100	4,750	0.032	7.60	0.015	1.00	17.33	126.8	1.00	12,680	219,731
	Upland crop	none	20.0	50	4,750	0.032	5.37	0.250	1.00	204.22		0.90	2,646	540,375
		terracing	20.0	15	4,750	0.032	2.94	0.250	0.16	17.90	29.4	0.10	294	5,262
	Forestation	none	20.0	100	4,750	0.032	7.60	0.100	1.00	115.53	14.2	1.00	1,420	164,047
	Natural forest	none	20.0	100	4,750	0.032	7.60	0.001	1.00	1.16	122.8	1.00	12,280	14,187
s>25%	Pasture-1	none	32.5	100	4,750	0.032	17.88	0.125	1.00	339.75	0.0	1.00	0	0
	Pasture-2	none	32.5	100	4,750	0.032	17.88	0.015	1.00	40.77	0.0	1.00	0	0
	Forestation	none	32.5	100	4,750	0.032	17.88	0.100	1.00	271.80	0.0	1.00	0	0
	Natural forest	none	32.5	100	4,750	0.032	17.88	0.001	1.00	2.72	0.0	1.00	0	0
Total													159,452	2,920,919

Source: JICA Study Team

Average = 18.3 ton/ha/year

## 10. Estimation of Soil Losses in Sub-basin L40-6

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topo-graphic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	5,500	0.032	0.75	0.125	1.00	16.41	0.0	0.16	0	0
		terracing	4.0	30	5,500	0.032	0.41	0.125	0.10	0.90		0.04	0	0
	Pasture-2	none	4.0	100	5,500	0.032	0.75	0.015	1.00	1.97	229.5	0.20	4,590	9,037
	Upland crop	none	4.0	50	5,500	0.032	0.53	0.250	1.00	23.20	24.8	0.16	397	9,207
		terracing	4.0	30	5,500	0.032	0.41	0.250	0.10	1.80		0.04	99	178
	Forestation	none	4.0	100	5,500	0.032	0.75	0.100	1.00	13.13	4.7	0.20	94	1,234
	Natural forest	none	4.0	100	5,500	0.032	0.75	0.001	1.00	0.13	62.0	0.20	1,240	163
5-15%	Pasture-1	none	10.0	100	5,500	0.032	2.49	0.125	1.00	54.71	300.5	0.80	24,040	1,315,151
		terracing	10.0	20	5,500	0.032	1.11	0.125	0.12	2.94		0.20	6,010	17,645
	Pasture-2	none	10.0	100	5,500	0.032	2.49	0.015	1.00	6.56	1,797.8	1.00	179,780	1,180,222
	Upland crop	none	10.0	50	5,500	0.032	1.76	0.250	1.00	77.37	218.8	0.80	17,504	1,354,233
		terracing	10.0	20	5,500	0.032	1.11	0.250	0.12	5.87		0.20	4,376	25,695
	Forestation	none	10.0	100	5,500	0.032	2.49	0.100	1.00	43.77	237.3	1.00	23,730	1,038,553
	Natural forest	none	10.0	100	5,500	0.032	2.49	0.001	1.00	0.44	1,711.6	1.00	171,160	74,909
15-25%	Pasture-1	none	20.0	100	5,500	0.032	7.60	0.125	1.00	167.21	61.6	0.80	4,928	824,006
		terracing	20.0	15	5,500	0.032	2.94	0.125	0.16	10.36		0.20	1,232	12,765
	Pasture-2	none	20.0	100	5,500	0.032	7.60	0.015	1.00	20.07	389.2	1.00	38,920	780,933
	Upland crop	none	20.0	50	5,500	0.032	5.37	0.250	1.00	236.47	40.6	0.80	3,248	768,052
		terracing	20.0	15	5,500	0.032	2.94	0.250	0.16	20.72		0.20	812	16,827
	Forestation	none	20.0	100	5,500	0.032	7.60	0.100	1.00	133.77	53.0	1.00	5,300	708,966
	Natural forest	none	20.0	100	5,500	0.032	7.60	0.001	1.00	1.34	393.9	1.00	39,390	52,691
s>25%	Pasture-1	none	32.5	100	5,500	0.032	17.88	0.125	1.00	393.39	0.0	1.00	0	0
	Pasture-2	none	32.5	100	5,500	0.032	17.88	0.015	1.00	47.21	0.0	1.00	0	0
	Forestation	none	32.5	100	5,500	0.032	17.88	0.100	1.00	314.71	0.0	1.00	0	0
	Natural forest	none	32.5	100	5,500	0.032	17.88	0.001	1.00	3.15	0.0	1.00	0	0
Total													526,850	8,190,466

Source: JICA Study Team

Average = 15.5 ton/ha/year

## 11. Estimation of Soil Losses in Sub-basin L40-7

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	5,000	0.032	0.75	0.125	1.00	14.92	0.0	0.15	0	0
		terracing	4.0	30	5,000	0.032	0.41	0.125	0.10	0.82		0.05	0	0
	Pasture-2	none	4.0	100	5,000	0.032	0.75	0.015	1.00	1.79	177.3	0.20	3,546	6,347
	Upland crop	none	4.0	50	5,000	0.032	0.53	0.250	1.00	21.09	89.6	0.15	1,344	28,350
		terracing	4.0	30	5,000	0.032	0.41	0.250	0.10	1.63		0.05	448	732
	Forestation	none	4.0	100	5,000	0.032	0.75	0.100	1.00	11.93	7.8	0.20	156	1,861
	Natural forest	none	4.0	100	5,000	0.032	0.75	0.001	1.00	0.12	75.3	0.20	1,506	180
5-15%	Pasture-1	none	10.0	100	5,000	0.032	2.49	0.125	1.00	49.73	0.0	0.75	0	0
		terracing	10.0	20	5,000	0.032	1.11	0.125	0.12	2.67		0.25	0	0
	Pasture-2	none	10.0	100	5,000	0.032	2.49	0.015	1.00	5.97	57.6	1.00	5,760	34,376
	Upland crop	none	10.0	50	5,000	0.032	1.76	0.250	1.00	70.33	58.2	0.75	4,365	307,007
		terracing	10.0	20	5,000	0.032	1.11	0.250	0.12	5.34		0.25	1,455	7,767
	Forestation	none	10.0	100	5,000	0.032	2.49	0.100	1.00	39.79	10.9	1.00	1,090	43,368
	Natural forest	none	10.0	100	5,000	0.032	2.49	0.001	1.00	0.40	52.8	1.00	5,280	2,101
15-25%	Pasture-1	none	20.0	100	5,000	0.032	7.60	0.125	1.00	152.01	0.0	0.75	0	0
		terracing	20.0	15	5,000	0.032	2.94	0.125	0.16	9.42		0.25	0	0
	Pasture-2	none	20.0	100	5,000	0.032	7.60	0.015	1.00	18.24	29.2	1.00	2,920	53,264
	Upland crop	none	20.0	50	5,000	0.032	5.37	0.250	1.00	214.97	17.9	0.75	1,343	288,600
		terracing	20.0	15	5,000	0.032	2.94	0.250	0.16	18.84		0.25	448	8,431
	Forestation	none	20.0	100	5,000	0.032	7.60	0.100	1.00	121.61	7.2	1.00	720	87,557
	Natural forest	none	20.0	100	5,000	0.032	7.60	0.001	1.00	1.22	32.8	1.00	3,280	3,989
s>25%	Pasture-1	none	32.5	100	5,000	0.032	17.88	0.125	1.00	357.63	0.0	1.00	0	0
	Pasture-2	none	32.5	100	5,000	0.032	17.88	0.015	1.00	42.92	0.0	1.00	0	0
	Forestation	none	32.5	100	5,000	0.032	17.88	0.100	1.00	286.10	0.0	1.00	0	0
	Natural forest	none	32.5	100	5,000	0.032	17.88	0.001	1.00	2.86	0.0	1.00	0	0
Total													33,660	873,927

Source: JICA Study Team

Average = 26.0 ton/ha/year

## 12. Estimation of Soil Losses in Sub-basin L40-8

Slope conditions	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topo-graphic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)	Area			Soil loss (ton)
											Gross (km <sup>2</sup> )	Ratio	Net (ha)	
s<5%	Pasture-1	none	4.0	100	5,500	0.032	0.75	0.125	1.00	16.41	0.0	0.15	0	0
		terracing	4.0	30	5,500	0.032	0.41	0.125	0.10	0.90		0.05	0	0
	Pasture-2	none	4.0	100	5,500	0.032	0.75	0.015	1.00	1.97	169.7	0.20	3,394	6,682
	Upland crop	none	4.0	50	5,500	0.032	0.53	0.250	1.00	23.20	105.3	0.15	1,580	36,650
		terracing	4.0	30	5,500	0.032	0.41	0.250	0.10	1.80		0.05	527	946
	Forestation	none	4.0	100	5,500	0.032	0.75	0.100	1.00	13.13	0.2	0.20	4	53
	Natural forest	none	4.0	100	5,500	0.032	0.75	0.001	1.00	0.13	41.8	0.20	836	110
5-15%	Pasture-1	none	10.0	100	5,500	0.032	2.49	0.125	1.00	54.71	0.0	0.75	0	0
		terracing	10.0	20	5,500	0.032	1.11	0.125	0.12	2.94		0.25	0	0
	Pasture-2	none	10.0	100	5,500	0.032	2.49	0.015	1.00	6.56	105.4	1.00	10,540	69,193
	Upland crop	none	10.0	50	5,500	0.032	1.76	0.250	1.00	77.37	176.0	0.75	13,200	1,021,245
		terracing	10.0	20	5,500	0.032	1.11	0.250	0.12	5.87		0.25	4,400	25,836
	Forestation	none	10.0	100	5,500	0.032	2.49	0.100	1.00	43.77	33.7	1.00	3,370	147,489
	Natural forest	none	10.0	100	5,500	0.032	2.49	0.001	1.00	0.44	195.6	1.00	19,560	8,561
15-25%	Pasture-1	none	20.0	100	5,500	0.032	7.60	0.125	1.00	167.21	0.0	0.75	0	0
		terracing	20.0	15	5,500	0.032	2.94	0.125	0.16	10.36		0.25	0	0
	Pasture-2	none	20.0	100	5,500	0.032	7.60	0.015	1.00	20.07	119.8	1.00	11,980	240,380
	Upland crop	none	20.0	50	5,500	0.032	5.37	0.250	1.00	236.47	53.7	0.75	4,028	952,380
		terracing	20.0	15	5,500	0.032	2.94	0.250	0.16	20.72		0.25	1,343	27,821
	Forestation	none	20.0	100	5,500	0.032	7.60	0.100	1.00	133.77	27.9	1.00	2,790	373,210
	Natural forest	none	20.0	100	5,500	0.032	7.60	0.001	1.00	1.34	127.6	1.00	12,760	17,069
s>25%	Pasture-1	none	32.5	100	5,500	0.032	17.88	0.125	1.00	393.39	0.0	1.00	0	0
	Pasture-2	none	32.5	100	5,500	0.032	17.88	0.015	1.00	47.21	0.0	1.00	0	0
	Forestation	none	32.5	100	5,500	0.032	17.88	0.100	1.00	314.71	0.0	1.00	0	0
	Natural forest	none	32.5	100	5,500	0.032	17.88	0.001	1.00	3.15	0.1	1.00	10	31
Total													90,320	2,927,655

Source: JICA Study Team

Average = 32.4 ton/ha/year

## **RIV-T-11 Case Study of Soil Loss by USLE**

- 1. Case Study of Soil Loss by USLE Equation (1/3)**
- 2. Case Study of Soil Loss by USLE Equation (2/3)**
- 3. Case Study of Soil Loss by USLE Equation (3/3)**
- 4. Sensible Analysis of Soil Loss by USLE Equation**

# 1. Case Study of Soil Loss by USLE Equation (1/3)

(1/3)

Case	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)
1	Upland crop without soil conseration with slope length of 100m	none	2.5	100	5,500	0.032	0.34	0.250	1.00	15.16
		none	5.0	100	5,500	0.032	0.97	0.250	1.00	42.54
		none	7.5	100	5,500	0.032	1.64	0.250	1.00	72.17
		none	10.0	100	5,500	0.032	2.49	0.250	1.00	109.41
		none	15.0	100	5,500	0.032	4.70	0.250	1.00	206.71
		none	20.0	100	5,500	0.032	7.60	0.250	1.00	334.42
2	Upland crop without soil conseration with slope length of 50m	none	2.5	50	5,500	0.032	0.28	0.250	1.00	12.32
		none	5.0	50	5,500	0.032	0.68	0.250	1.00	30.08
		none	7.5	50	5,500	0.032	1.16	0.250	1.00	51.03
		none	10.0	50	5,500	0.032	1.76	0.250	1.00	77.37
		none	15.0	50	5,500	0.032	3.32	0.250	1.00	146.16
		none	20.0	50	5,500	0.032	5.37	0.250	1.00	236.47
3	Upland crop without soil conseration with slope length of 30m	none	2.5	30	5,500	0.032	0.24	0.250	1.00	10.57
		none	5.0	30	5,500	0.032	0.53	0.250	1.00	23.30
		none	7.5	30	5,500	0.032	0.90	0.250	1.00	39.53
		none	10.0	30	5,500	0.032	1.36	0.250	1.00	59.93
		none	15.0	30	5,500	0.032	2.57	0.250	1.00	113.22
		none	20.0	30	5,500	0.032	4.16	0.250	1.00	183.17
4	Upland crop with countering with slope length of 100m	countering	2.5	100	5,500	0.032	0.34	0.250	0.50	7.58
		countering	5.0	100	5,500	0.032	0.97	0.250	0.50	21.27
		countering	7.5	100	5,500	0.032	1.64	0.250	0.50	36.09
		countering	10.0	100	5,500	0.032	2.49	0.250	0.60	65.65
		countering	15.0	100	5,500	0.032	4.70	0.250	0.70	144.69
		countering	20.0	100	5,500	0.032	7.60	0.250	0.80	267.53
5	Upland crop with countering with slope length of 50m	countering	2.5	50	5,500	0.032	0.28	0.250	0.50	6.16
		countering	5.0	50	5,500	0.032	0.68	0.250	0.50	15.04
		countering	7.5	50	5,500	0.032	1.16	0.250	0.50	25.52
		countering	10.0	50	5,500	0.032	1.76	0.250	0.60	46.42
		countering	15.0	50	5,500	0.032	3.32	0.250	0.70	102.31
		countering	20.0	50	5,500	0.032	5.37	0.250	0.80	189.18

Source: JICA Study Team

## 2. Case Study of Soil Loss by USLE Equation (2/3)

(2/3)

Case	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)
6	Upland crop with counterling with slope length of 30m	counterling	2.5	30	5,500	0.032	0.24	0.250	0.50	5.28
		counterling	5.0	30	5,500	0.032	0.53	0.250	0.50	11.65
		counterling	7.5	30	5,500	0.032	0.90	0.250	0.50	19.77
		counterling	10.0	30	5,500	0.032	1.36	0.250	0.60	35.96
		counterling	15.0	30	5,500	0.032	2.57	0.250	0.70	79.25
		counterling	20.0	30	5,500	0.032	4.16	0.250	0.80	146.53
7	Upland crop with strip cropping with slope length of 60m	stripping	2.5	60	5,500	0.032	0.30	0.250	0.25	3.25
		stripping	5.0	60	5,500	0.032	0.75	0.250	0.25	8.24
		stripping	7.5	60	5,500	0.032	1.27	0.250	0.25	13.98
		stripping	10.0	60	5,500	0.032	1.93	0.250	0.30	25.43
		stripping	15.0	60	5,500	0.032	3.64	0.250	0.30	48.03
		stripping	20.0	60	5,500	0.032	5.89	0.250	0.40	103.62
8	Upland crop with strip cropping with slope length of 30m	stripping	2.5	30	5,500	0.032	0.24	0.250	0.25	2.64
		stripping	5.0	30	5,500	0.032	0.53	0.250	0.25	5.82
		stripping	7.5	30	5,500	0.032	0.90	0.250	0.25	9.88
		stripping	10.0	30	5,500	0.032	1.36	0.250	0.30	17.98
		stripping	15.0	30	5,500	0.032	2.57	0.250	0.30	33.97
		stripping	20.0	30	5,500	0.032	4.16	0.250	0.40	73.27
9	Upland crop with terracing	terracing	2.5	30	5,500	0.032	0.24	0.250	0.10	1.06
		terracing	5.0	30	5,500	0.032	0.53	0.250	0.10	2.33
		terracing	7.5	25	5,500	0.032	0.82	0.250	0.12	4.33
		terracing	10.0	20	5,500	0.032	1.11	0.250	0.12	5.87
		terracing	15.0	18	5,500	0.032	1.99	0.250	0.14	12.28
		terracing	20.0	15	5,500	0.032	2.94	0.250	0.16	20.72

Source: JICA Study Team



### 3. Case Study of Soil Loss by USLE Equation (3/3)

(3/3)

Case	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)
10	Pasture without soil conseration with slope length of 100m	none	2.5	100	5,500	0.032	0.34	0.125	1.00	7.58
		none	5.0	100	5,500	0.032	0.97	0.125	1.00	21.27
		none	7.5	100	5,500	0.032	1.64	0.125	1.00	36.09
		none	10.0	100	5,500	0.032	2.49	0.125	1.00	54.71
		none	15.0	100	5,500	0.032	4.70	0.125	1.00	103.35
		none	20.0	100	5,500	0.032	7.60	0.125	1.00	167.21
11	Pasture without soil conseration with slope length of 50m	none	2.5	50	5,500	0.032	0.28	0.125	1.00	6.16
		none	5.0	50	5,500	0.032	0.68	0.125	1.00	15.04
		none	7.5	50	5,500	0.032	1.16	0.125	1.00	25.52
		none	10.0	50	5,500	0.032	1.76	0.125	1.00	38.68
		none	15.0	50	5,500	0.032	3.32	0.125	1.00	73.08
		none	20.0	50	5,500	0.032	5.37	0.125	1.00	118.23
12	Pasture without soil conseration with slope length of 30m	none	2.5	30	5,500	0.032	0.24	0.125	1.00	5.28
		none	5.0	30	5,500	0.032	0.53	0.125	1.00	11.65
		none	7.5	30	5,500	0.032	0.90	0.125	1.00	19.77
		none	10.0	30	5,500	0.032	1.36	0.125	1.00	29.96
		none	15.0	30	5,500	0.032	2.57	0.125	1.00	56.61
		none	20.0	30	5,500	0.032	4.16	0.125	1.00	91.58
13	Pasture with terracing	terracing	2.5	30	5,500	0.032	0.24	0.125	0.10	0.53
		terracing	5.0	30	5,500	0.032	0.53	0.125	0.10	1.16
		terracing	7.5	25	5,500	0.032	0.82	0.125	0.12	2.17
		terracing	10.0	20	5,500	0.032	1.11	0.125	0.12	2.94
		terracing	15.0	18	5,500	0.032	1.99	0.125	0.14	6.14
		terracing	20.0	15	5,500	0.032	2.94	0.125	0.16	10.36
14	Natural Pasture without soil conseration with slope length of 100m	none	2.5	100	5,500	0.032	0.34	0.015	1.00	0.91
		none	5.0	100	5,500	0.032	0.97	0.015	1.00	2.55
		none	7.5	100	5,500	0.032	1.64	0.015	1.00	4.33
		none	10.0	100	5,500	0.032	2.49	0.015	1.00	6.56
		none	15.0	100	5,500	0.032	4.70	0.015	1.00	12.40
		none	20.0	100	5,500	0.032	7.60	0.015	1.00	20.07

Source: JICA Study Team

#### 4. Sensible Analysis of Soil Loss by USLE Equation

Variable factor	Land use	Erosion control	Average slope steepness (%)	Slope length (m)	Rainfall factor (R)	Soil erodibility factor (K)	Topographic factor (LS)	Cropping management factor (C)	Conservation practice factor (P)	Unit soil loss (ton/ha/year)
slope	Upland crop	terracing	20.0	50	5,500	0.032	5.37	0.250	0.16	37.84
		terracing	16.0	50	5,500	0.032	3.69	0.250	0.14	22.75
		terracing	12.0	50	5,500	0.032	2.33	0.250	0.12	12.28
		terracing	8.0	50	5,500	0.032	1.27	0.250	0.12	6.70
		terracing	6.0	50	5,500	0.032	0.86	0.250	0.12	4.54
		terracing	4.0	50	5,500	0.032	0.53	0.250	0.10	2.32
slope length	Upland crop	none	5.0	160	5,500	0.032	1.22	0.250	1.00	53.81
		none	5.0	120	5,500	0.032	1.06	0.250	1.00	46.60
		none	5.0	80	5,500	0.032	0.86	0.250	1.00	38.05
		none	5.0	60	5,500	0.032	0.75	0.250	1.00	32.95
		none	5.0	40	5,500	0.032	0.61	0.250	1.00	26.90
		none	5.0	20	5,500	0.032	0.43	0.250	1.00	19.02
Rainfall factor	Upland crop	none	5.0	50	5,500	0.032	0.68	0.250	1.00	30.08
		none	5.0	50	5,000	0.032	0.68	0.250	1.00	27.35
		none	5.0	50	4,500	0.032	0.68	0.250	1.00	24.61
		none	5.0	50	4,000	0.032	0.68	0.250	1.00	21.88
		none	5.0	50	3,500	0.032	0.68	0.250	1.00	19.14
		none	5.0	50	3,000	0.032	0.68	0.250	1.00	16.41

Source: JICA Study Team

