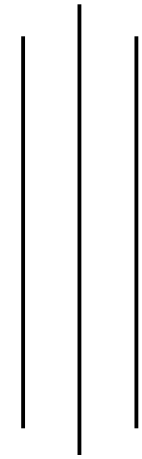
A

Report on

Quality Measurement of FRA Permanent Sample Plots [Re measurement in Terai Arc Landscape Area (MRV)]



Submitted By

Technical Committee

Dhirendra Pradhan (FRTC)
Binod Prasad Devkota (MoFE)
Bimal Kumar Acharya (FRTC)
Raj Kumar Giri (FRTC)
Shankar Adhikari (REDD-IC)
Govinda Shrestha (DoFSC)
Ananda Khadka (FRTC)

June 2022

1. Introduction

Forest Research and Training Center - FTRC (then Department of Forest Research and Survey) has been conducting Forest Resource Assessment (FRA) program all over the country since 2010. The first FRA reports were published during the FRA-I period (2010-2015). Since 2016, re-measurement of permanent sample plots in addition to establishing additional plots in different physiographic regions as per need to meet the accuracy level at sub national level have also been initiated. Furthermore, the second re measurement of those sample plots have been initiated since current fiscal year (2078/079). The current assignment of re measurement of sample plots is focused on the Terai Arc Landscape (TAL) area of southern Nepal due to the data needs for Nepal's first Emission Reduction monitoring report.

In this regard, the total assignment of re measurement of 568 forest sample plots was divided in to two different clusters. The first cluster for sample plots in Bardiya, Kailali and Kanchanpur districts (251 plots) was assigned to PEES-Rajdevi-SMART Jv. whereas the second cluster for 317 sample plots in Banke to Rautahat districts of TAL area was assigned to Genesis Consultancy Pvt. Ltd.

As per the requirement of TOR and contract of the program, the final payment to the consultant shall only be done after a thorough assessment of submitted data. In this regard, there is a provision to re-measure certain sample plots and perform quality assessment. The quality measurement works were conducted in the 10% of the plots measured by service provider to check the quality and consistency of the sample plot measurement. Altogether, 62 plots were selected for the QAQC work during the meetings of the technical committee. The number of plots required for QAQC in cluster I was 26 for which data from 27 plots have been collected whereas 32 plots were required for QAQC in cluster II for which data from 35 plots have been collected.

2. Objective

The overall objective of the quality measurement was to assure the measurement to be precise and calculate the differences in the actual measurement and quality measurement to assess the correctness of the data collected by the crew members of service providers.

The specific objectives of the quality measurement were:

- To calculate the deviation in stand density and basal area per hectare
- To assure that CCSP rules has been applied correctly during the measurement
- To observe and assure that other FRA variables are also properly measured
- To improve the field work activities in future

3. Methodology

3.1 Plot Selection:

The consultants submitted the data after completion of the assignments. For the first cluster, data of 258 (assigned for 251) plots have been received for which 27 number of plots were selected for QAQC. For the second cluster, data of 317 plots have been received for which 35 number of plots were selected for QAQC. The selection procedures were performed during the meetings of the technical committee formed for this program.

3.2 Field Measurement:

Considering the above-mentioned plot selection criteria, there were 62 sample plots selected for the quality measurement. Measurement was more concentrated on those variables which have more permanency in feature and correctly re-measurable. In the field measurement, only the tree and climber variables (Tally sheet form no. 3) were measured against the original measurement using the FRA Field Manual 2010 (Modified in 2017 and 2019). The variables other than trees and climbers were only observed during the quality assessments.

3.3 Data Analysis:

Data collected in both quality measurement and original measurement for each tree were analysed. Firstly, all tree data (including stump and climber) were arranged as its original measurement sequential order. The number of trees per plot and per hectare was calculated for both measurements. The basal area for each tree was calculated and sum up for its per plot value and also calculated per hectare. The deviation of each tree in term of basal area was also calculated considering respective DBH. During the data analysis both deviation (negative and positive) was considered as deviation removing negative sign from the analysis (Absolute deviation of DBH and Basal area were calculated). The average number of trees and basal area per hectare of original measurement were considered to calculate the variation. From per hectare value, average number of trees and basal area per hectare calculated. Those calculated data were presented as per hectare value averaged and compared against the original calculation to evaluate the deviation percentage in each category (i.e. no of trees per ha and basal area per ha).

4. Results and Discussion

Coordinate of the plot had been properly located and recorded in tally sheet in all the plots measured in quality assessment. Similarly, iron peg in both plot center and 5m north from the plot center had been inserted. However, for those CCSP where the plot area around north from the center was inaccessible, the 5-m N peg was found inserted at 5-m E or 3.5 m N with written remarks. In most of the plots reference trees (Fixed Points) had been assigned

properly. The distance and bearing of each of the trees in plots were measured and recorded precisely with only insignificant variation. So, there were no significant problem was encountered while identifying individual trees in the plots. Height, general variables (forest type, crown cover, development status, management regime, location and size soil pits, human disturbance) etc., were generally observed during the quality assessment and found no significant issues in those variables. Furthermore, variation in terms of shrubs, small tree measurements and NTFPs was not found significantly different.

However, quality assessment found some minor problems in species identification. However, herbarium submitted to the FRTC later helped to identify plants with the help of FRTC experts. The comparison of quality with original measurement were conducted only for number of trees per ha and basal area per ha.

For cluster I, the total error in DBH measurement was found 1.004 %. Similarly, the error in trees per hectare was found 1.44 % and the total variation in basal area per hectare was found to be 0.77 %.

Following figure shows the number of trees per hectare in both original and quality measurement for each of plots. The differences in per plot data was found to be insignificant.

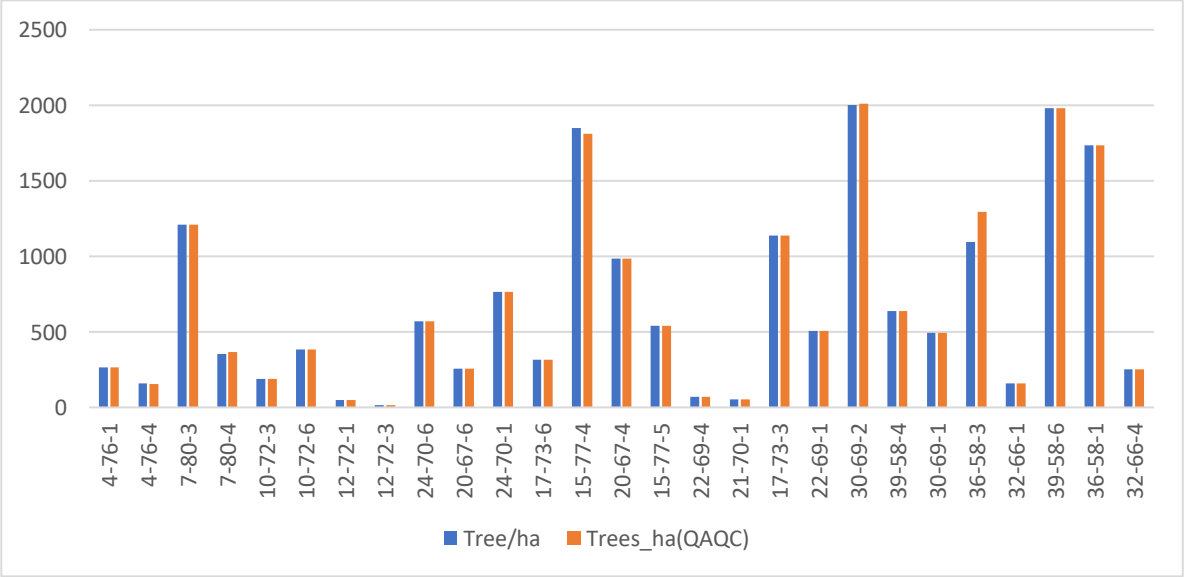


Figure 1: Comparison of number of trees per/ha by Plot

Similarly, following figure shows the basal area per hectare in both original and quality measurement for each of plots. The differences in per plot data found to be insignificant.

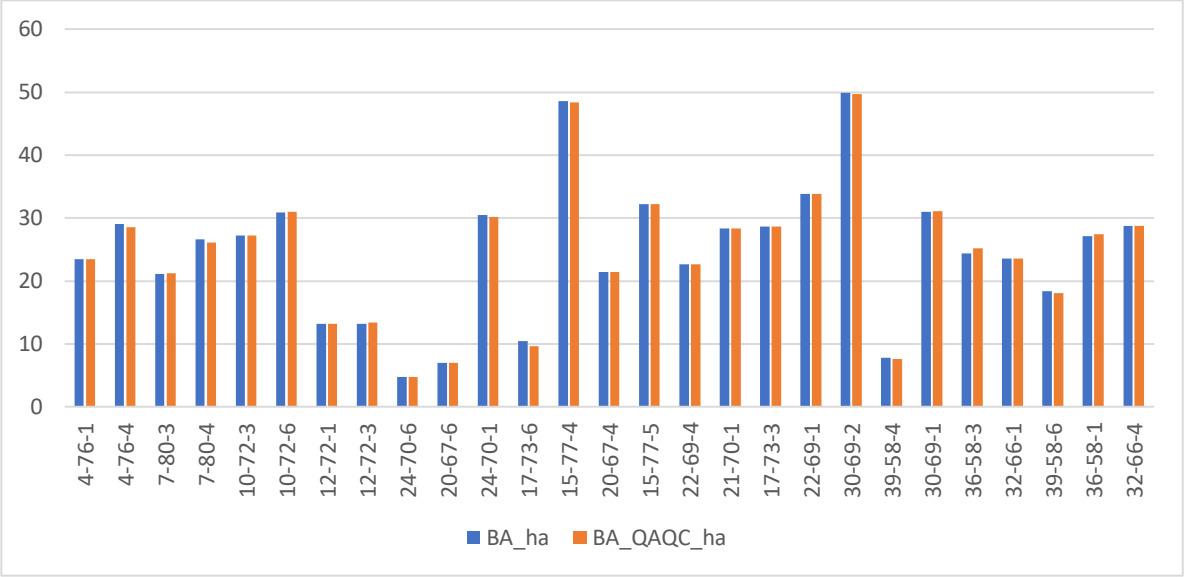


Figure 2: Comparison of Basal Area per ha in each plot

Similarly, for cluster II, the total error in DBH measurement was found 1.70 %. Similarly, the error in trees per hectare was found 4.24 % and the total variation in basal area per hectare was found to be 1.85 %.

Following figure shows the number of trees per hectare in both original and quality measurement for each of plots in cluster II. The differences in per plot data was found to be insignificant.

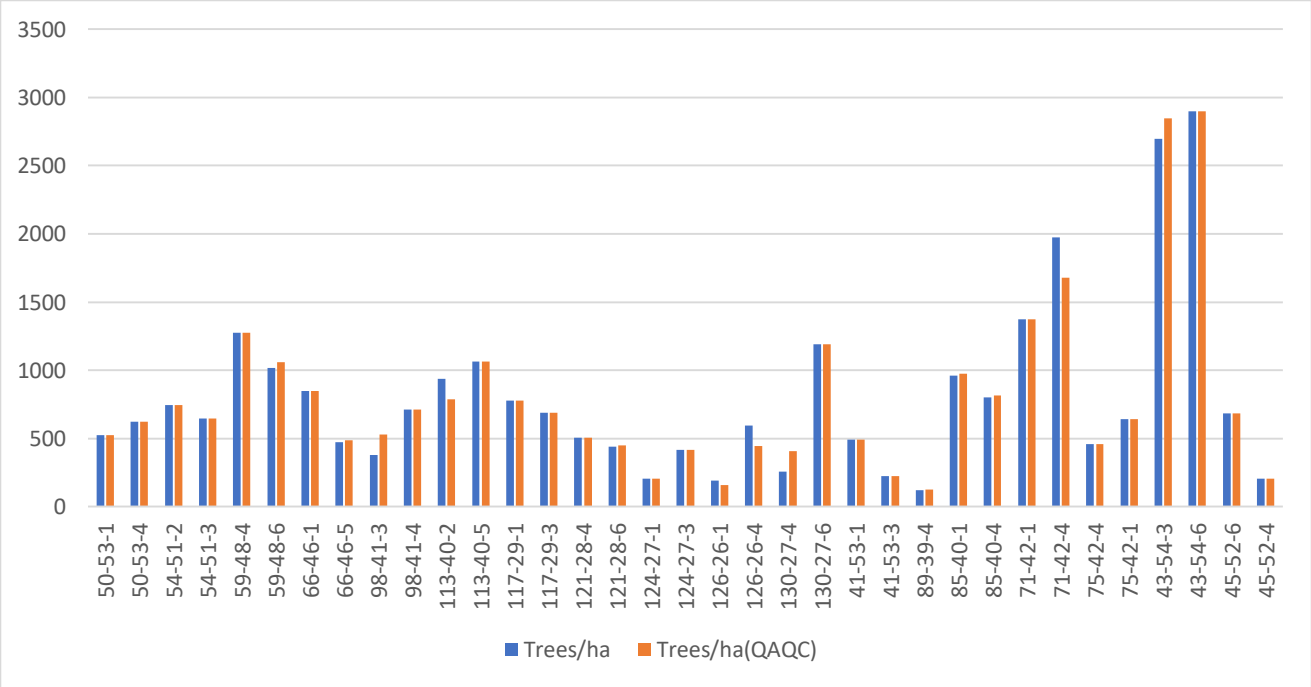


Figure 1: Comparison of number of trees per/ha by Plot

Similarly, following figure shows the basal area per hectare in both original and quality measurement for each of plots in cluster II. The differences in per plot data found to be insignificant.

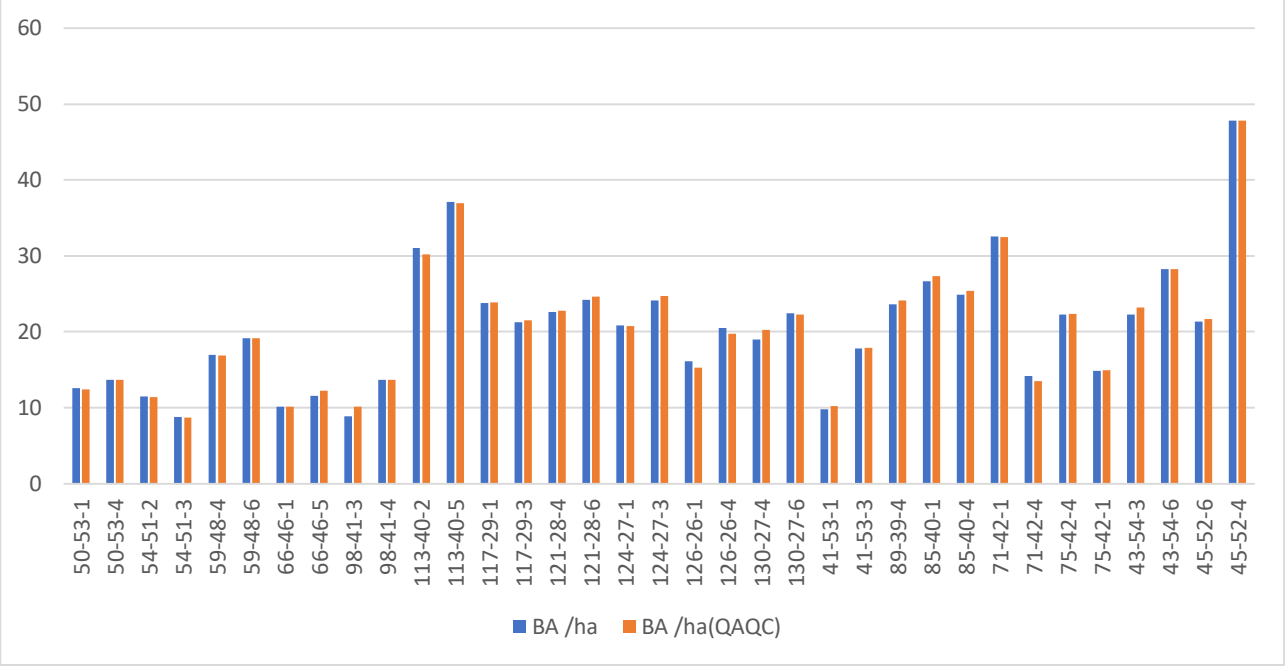


Figure 2: Comparison of Basal Area per ha in each plot

5. Conclusion and Recommendation

As per the analysis of the quality measurement data the deviation seems well below the required margin in the re measured plots of TAL area set by TOR (and contract agreement) of the project (i.e. within 5%). So, the original measurement conducted by the service provider companies (i.e. PEES-Rajdevi_SMART Jv. and Genesis Consultancy Pvt. Ltd.) can be considered as a reliable measurement for Forest Resource Assessment in TAL area.

Annex I: **List of Plots Remeasured (Total 568 plots)**

Cluster I

SN	col	row	Plot Number	X	Y	DISTRICT
1	3	76	1	414691	3196808	KANCHANPUR
2	3	76	3	414691	3197108	KANCHANPUR
3	3	76	4	414991	3196808	KANCHANPUR
4	3	76	6	414991	3197108	KANCHANPUR
5	4	76	1	418690	3196905	KANCHANPUR
6	4	76	3	418690	3197205	KANCHANPUR
7	4	76	4	418990	3196905	KANCHANPUR
8	5	73	4	423279	3185005	KANCHANPUR
9	5	76	1	422689	3197002	KANCHANPUR
10	5	76	3	422689	3197302	KANCHANPUR
11	5	76	4	422989	3197002	KANCHANPUR
12	5	76	6	422989	3197302	KANCHANPUR
13	5	79	2	422399	3209148	KANCHANPUR
14	5	79	3	422399	3209298	KANCHANPUR
15	5	79	6	422699	3209298	KANCHANPUR
16	6	76	3	426688	3197398	KANCHANPUR
17	6	76	4	426988	3197098	KANCHANPUR
18	6	76	6	426988	3197398	KANCHANPUR
19	7	74	1	430880	3189197	KANCHANPUR
20	7	74	3	430880	3189497	KANCHANPUR
21	7	74	4	431180	3189197	KANCHANPUR
22	7	74	6	431180	3189497	KANCHANPUR
23	7	80	1	430300	3213190	KANCHANPUR
24	7	80	2	430300	3213340	KANCHANPUR
25	7	80	3	430300	3213490	KANCHANPUR
26	7	80	4	430600	3213190	KANCHANPUR
27	7	80	5	430600	3213340	KANCHANPUR
28	7	80	6	430600	3213490	KANCHANPUR
29	8	72	1	435072	3181296	KANCHANPUR
30	8	72	3	435072	3181596	KANCHANPUR
31	8	72	4	435372	3181296	KANCHANPUR
32	8	72	6	435372	3181596	KANCHANPUR
33	8	78	1	434492	3205289	KANCHANPUR
34	8	78	3	434492	3205589	KANCHANPUR
35	8	78	4	434792	3205289	KANCHANPUR
36	8	78	6	434792	3205589	KANCHANPUR
37	9	76	1	438684	3197388	KANCHANPUR
38	9	76	3	438684	3197688	KANCHANPUR
39	9	76	4	438984	3197388	KANCHANPUR

40	9	76	6	438984	3197688	KANCHANPUR
41	9	79	1	438394	3209385	KANCHANPUR
42	9	79	2	438394	3209535	KANCHANPUR
43	9	79	3	438394	3209685	KANCHANPUR
44	9	79	4	438694	3209385	KANCHANPUR
45	9	79	6	438694	3209685	KANCHANPUR
46	10	72	3	443070	3181790	KANCHANPUR
47	10	72	4	443370	3181490	KANCHANPUR
48	10	72	6	443370	3181790	KANCHANPUR
49	10	75	3	442780	3193786	KANCHANPUR
50	10	75	6	443080	3193786	KANCHANPUR
51	11	73	1	446972	3185585	KANCHANPUR
52	11	73	3	446972	3185885	KANCHANPUR
53	11	73	4	447272	3185585	KANCHANPUR
54	11	73	6	447272	3185885	KANCHANPUR
55	11	77	1	446585	3201580	KANCHANPUR
56	11	77	3	446585	3201880	KANCHANPUR
57	11	77	4	446885	3201580	KANCHANPUR
58	11	77	6	446885	3201880	KANCHANPUR
59	11	78	1	446488	3205579	KANCHANPUR
60	11	78	2	446488	3205729	KANCHANPUR
61	11	78	3	446488	3205879	KANCHANPUR
62	11	78	4	446788	3205579	KANCHANPUR
63	11	78	5	446788	3205729	KANCHANPUR
64	11	78	6	446788	3205879	KANCHANPUR
65	12	72	1	451067	3181683	KANCHANPUR
66	12	72	3	451067	3181983	KANCHANPUR
67	13	73	1	454970	3185779	KAILALI
68	13	73	3	454970	3186079	KAILALI
69	13	73	4	455270	3185779	KAILALI
70	13	73	6	455270	3186079	KAILALI
71	14	74	1	458872	3189874	KAILALI
72	14	74	3	458872	3190174	KAILALI
73	14	74	6	459172	3190174	KAILALI
74	14	76	1	458678	3197872	KAILALI
75	14	76	2	458678	3198022	KAILALI
76	14	76	3	458678	3198172	KAILALI
77	14	76	4	458978	3197872	KAILALI
78	14	76	5	458978	3198022	KAILALI
79	14	76	6	458978	3198172	KAILALI
80	15	72	1	463064	3181973	KAILALI
81	15	72	3	463064	3182273	KAILALI
82	15	72	4	463364	3181973	KAILALI

83	15	72	6	463364	3182273	KAILALI
84	15	77	1	462580	3201967	KAILALI
85	15	77	2	462580	3202117	KAILALI
86	15	77	3	462580	3202267	KAILALI
87	15	77	4	462880	3201967	KAILALI
88	15	77	5	462880	3202117	KAILALI
89	15	77	6	462880	3202267	KAILALI
90	16	69	1	467353	3170073	KAILALI
91	16	69	3	467353	3170373	KAILALI
92	16	69	4	467653	3170073	KAILALI
93	16	69	6	467653	3170373	KAILALI
94	16	73	1	466966	3186069	KAILALI
95	16	73	3	466966	3186369	KAILALI
96	16	73	4	467266	3186069	KAILALI
97	16	73	6	467266	3186369	KAILALI
98	16	79	1	466386	3210062	KAILALI
99	16	79	2	466386	3210212	KAILALI
100	16	79	3	466386	3210362	KAILALI
101	16	79	4	466686	3210062	KAILALI
102	17	70	1	471255	3174169	KAILALI
103	17	70	3	471255	3174469	KAILALI
104	17	70	4	471555	3174169	KAILALI
105	17	70	6	471555	3174469	KAILALI
106	17	73	3	470965	3186465	KAILALI
107	17	73	6	471265	3186465	KAILALI
108	18	70	4	475554	3174265	KAILALI
109	18	70	6	475554	3174565	KAILALI
110	18	76	1	474674	3198258	KAILALI
111	18	76	2	474674	3198408	KAILALI
112	18	76	4	474974	3198258	KAILALI
113	18	76	5	474974	3198408	KAILALI
114	18	76	6	474974	3198558	KAILALI
115	19	69	1	479349	3170363	KAILALI
116	19	69	3	479349	3170663	KAILALI
117	19	69	4	479649	3170363	KAILALI
118	19	69	6	479649	3170663	KAILALI
119	19	72	1	479059	3182360	KAILALI
120	19	72	3	479059	3182660	KAILALI
121	19	72	4	479359	3182360	KAILALI
122	19	72	6	479359	3182660	KAILALI
123	20	67	3	483541	3162762	KAILALI
124	20	67	4	483841	3162462	KAILALI
125	20	67	6	483841	3162762	KAILALI

126	20	72	3	483058	3182756	KAILALI
127	20	73	2	482961	3186605	KAILALI
128	20	73	3	482961	3186755	KAILALI
129	20	73	4	483261	3186455	KAILALI
130	20	73	5	483261	3186605	KAILALI
131	20	73	6	483261	3186755	KAILALI
132	21	67	1	487540	3162559	KAILALI
133	21	67	3	487540	3162859	KAILALI
134	21	67	4	487840	3162559	KAILALI
135	21	67	6	487840	3162859	KAILALI
136	21	70	1	487250	3174555	KAILALI
137	21	73	1	486960	3186552	KAILALI
138	21	73	3	486960	3186852	KAILALI
139	21	73	4	487260	3186552	KAILALI
140	21	73	6	487260	3186852	KAILALI
141	21	76	1	486670	3198548	KAILALI
142	21	76	3	486670	3198848	KAILALI
143	21	76	4	486970	3198548	KAILALI
144	21	76	5	486970	3198698	KAILALI
145	22	69	1	491346	3170653	KAILALI
146	22	69	4	491646	3170653	KAILALI
147	22	69	6	491646	3170953	KAILALI
148	23	63	3	495925	3147057	KAILALI
149	23	63	6	496225	3147057	KAILALI
150	23	67	1	495538	3162752	KAILALI
151	23	67	3	495538	3163052	KAILALI
152	23	67	4	495838	3162752	KAILALI
153	23	67	6	495838	3163052	KAILALI
154	23	72	1	495055	3182747	KAILALI
155	23	72	3	495055	3183047	KAILALI
156	23	72	6	495355	3183047	KAILALI
157	23	73	2	494958	3186895	KAILALI
158	23	73	4	495258	3186745	KAILALI
159	23	73	5	495258	3186895	KAILALI
160	23	73	6	495258	3187045	KAILALI
161	24	70	1	499247	3174846	KAILALI
162	24	70	4	499547	3174846	KAILALI
163	24	70	6	499547	3175146	KAILALI
164	24	76	1	498667	3198839	KAILALI
165	24	76	2	498667	3198989	KAILALI
166	24	76	3	498667	3199139	KAILALI
167	24	76	4	498967	3198839	KAILALI
168	24	76	5	498967	3198989	KAILALI

169	24	76	6	498967	3199139	KAILALI
170	25	70	1	503246	3174942	KAILALI
171	25	70	6	503546	3175242	KAILALI
172	26	63	6	508221	3147347	KAILALI
173	27	74	1	510857	3191131	KAILALI
174	28	65	1	515725	3155238	KAILALI
175	28	65	3	515725	3155538	KAILALI
176	29	68	1	519434	3167331	KAILALI
177	29	68	2	519434	3167481	KAILALI
178	29	68	3	519434	3167631	KAILALI
179	29	68	4	519734	3167331	KAILALI
180	29	68	5	519734	3167481	KAILALI
181	29	68	6	519734	3167631	KAILALI
182	30	64	3	523820	3151733	BARDIYA
183	30	69	1	523336	3171427	KAILALI
184	30	69	2	523336	3171577	KAILALI
185	30	69	3	523336	3171727	KAILALI
186	30	69	5	523636	3171577	KAILALI
187	30	69	6	523636	3171727	KAILALI
188	31	59	1	528302	3131535	BARDIYA
189	31	59	3	528302	3131835	BARDIYA
190	31	59	4	528602	3131535	BARDIYA
191	31	59	6	528602	3131835	BARDIYA
192	31	62	1	528012	3143532	BARDIYA
193	31	62	3	528012	3143832	BARDIYA
194	31	62	4	528312	3143532	BARDIYA
195	31	62	6	528312	3143832	BARDIYA
196	31	66	1	527625	3159527	BARDIYA
197	31	66	3	527625	3159827	BARDIYA
198	31	66	4	527925	3159527	BARDIYA
199	31	66	6	527925	3159827	BARDIYA
200	32	63	3	531914	3147927	BARDIYA
201	32	63	4	532214	3147627	BARDIYA
202	32	63	6	532214	3147927	BARDIYA
203	32	66	1	531624	3159624	BARDIYA
204	32	66	3	531624	3159924	BARDIYA
205	32	66	4	531924	3159624	BARDIYA
206	32	66	6	531924	3159924	BARDIYA
207	33	61	1	536106	3139726	BARDIYA
208	33	61	3	536106	3140026	BARDIYA
209	33	61	4	536406	3139726	BARDIYA
210	33	61	6	536406	3140026	BARDIYA
211	34	56	1	540589	3119829	BARDIYA

212	34	56	3	540589	3120129	BARDIYA
213	34	56	4	540889	3119829	BARDIYA
214	34	56	6	540889	3120129	BARDIYA
215	34	64	1	539815	3151819	BARDIYA
216	34	64	2	539815	3151969	BARDIYA
217	34	64	3	539815	3152119	BARDIYA
218	34	64	4	540115	3151819	BARDIYA
219	34	64	5	540115	3151969	BARDIYA
220	34	64	6	540115	3152119	BARDIYA
221	35	56	4	544887	3119925	BARDIYA
222	35	56	6	544887	3120225	BARDIYA
223	36	58	1	548393	3128020	BARDIYA
224	36	58	3	548393	3128320	BARDIYA
225	36	58	4	548693	3128020	BARDIYA
226	36	58	6	548693	3128320	BARDIYA
227	36	65	1	547716	3156012	BARDIYA
228	36	65	2	547716	3156162	BARDIYA
229	36	65	3	547716	3156312	BARDIYA
230	36	65	4	548016	3156012	BARDIYA
231	36	65	5	548016	3156162	BARDIYA
232	36	65	6	548016	3156312	BARDIYA
233	37	59	1	552295	3132115	BARDIYA
234	37	59	3	552295	3132415	BARDIYA
235	37	59	4	552595	3132115	BARDIYA
236	37	59	6	552595	3132415	BARDIYA
237	37	63	1	551908	3148111	BARDIYA
238	37	63	2	551908	3148261	BARDIYA
239	37	63	3	551908	3148411	BARDIYA
240	37	63	4	552208	3148111	BARDIYA
241	37	63	5	552208	3148261	BARDIYA
242	37	63	6	552208	3148411	BARDIYA
243	38	61	1	556101	3140210	BARDIYA
244	38	61	2	556101	3140360	BARDIYA
245	38	61	3	556101	3140510	BARDIYA
246	38	61	5	556401	3140360	BARDIYA
247	39	58	1	560389	3128310	BARDIYA
248	39	58	3	560389	3128610	BARDIYA
249	39	58	4	560689	3128310	BARDIYA
250	39	58	6	560689	3128610	BARDIYA
251	40	60	1	564195	3136404	BARDIYA
252	40	60	2	564195	3136554	BARDIYA
253	40	60	3	564195	3136704	BARDIYA
254	40	60	6	564495	3136704	BARDIYA

255	41	61	2	568097	3140650	BARDIYA
256	41	61	3	568097	3140800	BARDIYA
257	41	61	4	568397	3140500	BARDIYA
258	41	61	5	568397	3140650	BARDIYA

Cluster II

SN	col	row	Plot__numb	X	Y	DISTRICT
1	37	52	1	552972	3104123	BANKE
2	37	52	6	553272	3104423	BANKE
3	41	53	1	568870	3108509	BANKE
4	41	53	3	568870	3108809	BANKE
5	41	53	4	569170	3108509	BANKE
6	41	53	6	569170	3108809	BANKE
7	41	58	1	568387	3128503	BANKE
8	41	58	3	568387	3128803	BANKE
9	41	58	4	568687	3128503	BANKE
10	41	58	6	568687	3128803	BANKE
11	42	55	1	572676	3116603	BANKE
12	42	55	3	572676	3116903	BANKE
13	42	55	4	572976	3116603	BANKE
14	42	55	6	572976	3116903	BANKE
15	43	50	1	577158	3096706	BANKE
16	43	50	3	577158	3097006	BANKE
17	43	50	4	577458	3096706	BANKE
18	43	50	6	577458	3097006	BANKE
19	43	54	1	576771	3112701	BANKE
20	43	54	3	576771	3113001	BANKE
21	43	54	4	577071	3112701	BANKE
22	43	54	6	577071	3113001	BANKE
23	44	48	1	581350	3088805	BANKE
24	44	48	3	581350	3089105	BANKE
25	44	48	4	581650	3088805	BANKE
26	44	48	6	581650	3089105	BANKE
27	44	55	1	580674	3116797	BANKE
28	44	55	3	580674	3117097	BANKE
29	44	55	4	580974	3116797	BANKE
30	44	55	6	580974	3117097	BANKE
31	45	50	1	585156	3096899	BANKE
32	45	50	2	585156	3097049	BANKE
33	45	50	3	585156	3097199	BANKE
34	45	50	4	585456	3096899	BANKE
35	45	50	5	585456	3097049	BANKE

36	45	50	6	585456	3097199	BANKE
37	45	52	4	585262	3104897	BANKE
38	45	52	6	585262	3105197	BANKE
39	46	52	1	588961	3104994	BANKE
40	46	52	3	588961	3105294	BANKE
41	46	52	4	589261	3104994	BANKE
42	46	52	6	589261	3105294	BANKE
43	47	55	2	592670	3117237	BANKE
44	47	55	3	592670	3117387	BANKE
45	47	55	5	592970	3117237	BANKE
46	48	52	1	596959	3105187	BANKE
47	48	52	2	596959	3105337	BANKE
48	48	52	3	596959	3105487	BANKE
49	48	52	4	597259	3105187	BANKE
50	48	52	5	597259	3105337	BANKE
51	48	52	6	597259	3105487	BANKE
52	50	53	1	604860	3109379	DANG
53	50	53	2	604860	3109529	DANG
54	50	53	3	604860	3109679	DANG
55	50	53	4	605160	3109379	DANG
56	50	53	5	605160	3109529	DANG
57	50	53	6	605160	3109679	DANG
58	51	51	1	609052	3101478	BANKE
59	51	51	2	609052	3101628	BANKE
60	51	51	3	609052	3101778	BANKE
61	51	51	4	609352	3101478	BANKE
62	51	51	5	609352	3101628	BANKE
63	51	51	6	609352	3101778	BANKE
64	52	51	1	613051	3101575	BANKE
65	52	51	3	613051	3101875	BANKE
66	52	51	4	613351	3101575	BANKE
67	52	51	5	613351	3101725	BANKE
68	52	51	6	613351	3101875	BANKE
69	53	54	2	616760	3113818	DANG
70	53	54	3	616760	3113968	DANG
71	53	54	4	617060	3113668	DANG
72	53	54	5	617060	3113818	DANG
73	53	54	6	617060	3113968	DANG
74	54	51	1	621049	3101768	DANG
75	54	51	2	621049	3101918	DANG
76	54	51	3	621049	3102068	DANG
77	54	51	4	621349	3101768	DANG
78	54	51	5	621349	3101918	DANG

79	54	51	6	621349	3102068	DANG
80	55	54	2	624757	3114011	DANG
81	55	54	3	624757	3114161	DANG
82	57	48	2	633335	3090212	DANG
83	57	48	3	633335	3090362	DANG
84	57	48	4	633635	3090062	DANG
85	57	48	5	633635	3090212	DANG
86	58	48	1	637334	3090158	DANG
87	58	48	2	637334	3090308	DANG
88	58	48	3	637334	3090458	DANG
89	58	48	4	637634	3090158	DANG
90	58	48	5	637634	3090308	DANG
91	58	48	6	637634	3090458	DANG
92	59	48	1	641333	3090255	DANG
93	59	48	2	641333	3090405	DANG
94	59	48	3	641333	3090555	DANG
95	59	48	4	641633	3090255	DANG
96	59	48	5	641633	3090405	DANG
97	59	48	6	641633	3090555	DANG
98	60	52	3	644945	3106647	DANG
99	60	52	4	645245	3106347	DANG
100	60	52	5	645245	3106497	DANG
101	62	43	1	653813	3070551	DANG
102	62	43	2	653813	3070701	DANG
103	62	43	3	653813	3070851	DANG
104	62	43	4	654113	3070551	DANG
105	62	43	5	654113	3070701	DANG
106	62	43	6	654113	3070851	DANG
107	66	41	1	670001	3062940	KAPILBASTU
108	66	41	3	670001	3063240	KAPILBASTU
109	66	41	4	670301	3062940	KAPILBASTU
110	66	41	6	670301	3063240	KAPILBASTU
111	66	46	1	669518	3082934	DANG
112	66	46	3	669518	3083234	DANG
113	66	46	4	669818	3082934	DANG
114	66	46	5	669818	3083084	DANG
115	66	46	6	669818	3083234	DANG
116	68	42	1	677902	3067132	KAPILBASTU
117	68	42	3	677902	3067432	KAPILBASTU
118	68	42	4	678202	3067132	KAPILBASTU
119	68	42	6	678202	3067432	KAPILBASTU
120	68	43	1	677806	3071131	KAPILBASTU
121	68	43	2	677806	3071281	KAPILBASTU

122	68	43	3	677806	3071431	KAPILBASTU
123	68	43	4	678106	3071131	KAPILBASTU
124	68	43	5	678106	3071281	KAPILBASTU
125	70	42	1	685900	3067326	KAPILBASTU
126	70	42	3	685900	3067626	KAPILBASTU
127	70	42	4	686200	3067326	KAPILBASTU
128	70	42	6	686200	3067626	KAPILBASTU
129	71	42	1	689899	3067422	KAPILBASTU
130	71	42	3	689899	3067722	KAPILBASTU
131	71	42	4	690199	3067422	KAPILBASTU
132	71	42	6	690199	3067722	KAPILBASTU
133	72	41	1	693994	3063520	KAPILBASTU
134	72	41	3	693994	3063820	KAPILBASTU
135	74	39	1	702185	3055716	KAPILBASTU
136	74	39	3	702185	3056016	KAPILBASTU
137	74	39	4	702485	3055716	KAPILBASTU
138	74	39	6	702485	3056016	KAPILBASTU
139	74	42	1	701895	3067712	KAPILBASTU
140	74	42	3	701895	3068012	KAPILBASTU
141	74	42	4	702195	3067712	KAPILBASTU
142	74	42	6	702195	3068012	KAPILBASTU
143	75	42	1	705894	3067809	KAPILBASTU
144	75	42	3	705894	3068109	KAPILBASTU
145	75	42	4	706194	3067809	KAPILBASTU
146	75	42	6	706194	3068109	KAPILBASTU
147	76	43	2	709796	3072055	KAPILBASTU
148	76	43	3	709796	3072205	KAPILBASTU
149	76	43	4	710096	3071905	KAPILBASTU
150	76	43	5	710096	3072055	KAPILBASTU
151	77	42	1	713892	3068002	KAPILBASTU
152	77	42	3	713892	3068302	KAPILBASTU
153	77	42	4	714192	3068002	KAPILBASTU
154	77	42	6	714192	3068302	KAPILBASTU
155	78	42	1	717891	3068099	KAPILBASTU
156	78	42	3	717891	3068399	KAPILBASTU
157	78	42	4	718191	3068099	KAPILBASTU
158	78	42	6	718191	3068399	KAPILBASTU
159	85	40	1	746076	3060778	RUPANDEHI
160	85	40	3	746076	3061078	RUPANDEHI
161	85	40	4	746376	3060778	RUPANDEHI
162	85	40	6	746376	3061078	RUPANDEHI
163	89	39	4	762468	3057166	NAWALPARASI
164	91	39	1	770166	3057359	NAWALPARASI

165	91	39	2	770166	3057509	NAWALPARASI
166	91	39	3	770166	3057659	NAWALPARASI
167	91	39	4	770466	3057359	NAWALPARASI
168	91	39	5	770466	3057509	NAWALPARASI
169	91	39	6	770466	3057659	NAWALPARASI
170	95	38	4	786558	3053747	NAWALPARASI
171	96	39	1	790160	3057843	NAWALPARASI
172	96	39	2	790160	3057993	NAWALPARASI
173	96	39	3	790160	3058143	NAWALPARASI
174	96	39	4	790460	3057843	NAWALPARASI
175	96	39	5	790460	3057993	NAWALPARASI
176	96	39	6	790460	3058143	NAWALPARASI
177	97	40	1	794062	3061938	NAWALPARASI
178	97	40	2	794062	3062088	NAWALPARASI
179	97	40	3	794062	3062238	NAWALPARASI
180	97	40	4	794362	3061938	NAWALPARASI
181	97	40	5	794362	3062088	NAWALPARASI
182	97	40	6	794362	3062238	NAWALPARASI
183	98	41	3	206312	3066235	NAWALPARASI
184	98	41	4	206612	3065935	NAWALPARASI
185	98	41	5	206612	3066085	NAWALPARASI
186	101	40	1	218212	3061646	NAWALPARASI
187	101	40	2	218212	3061796	NAWALPARASI
188	101	40	3	218212	3061946	NAWALPARASI
189	101	40	4	218512	3061646	NAWALPARASI
190	101	40	5	218512	3061796	NAWALPARASI
191	101	40	6	218512	3061946	NAWALPARASI
192	103	40	1	226209	3061453	NAWALPARASI
193	103	40	2	226209	3061603	NAWALPARASI
194	103	40	3	226209	3061753	NAWALPARASI
195	103	40	4	226509	3061453	NAWALPARASI
196	103	40	5	226509	3061603	NAWALPARASI
197	103	40	6	226509	3061753	NAWALPARASI
198	105	36	1	233820	3045264	CHITAWAN
199	105	36	2	233820	3045414	CHITAWAN
200	105	36	3	233820	3045564	CHITAWAN
201	105	36	4	234120	3045264	CHITAWAN
202	105	36	5	234120	3045414	CHITAWAN
203	105	36	6	234120	3045564	CHITAWAN
204	107	33	1	241528	3033074	CHITAWAN
205	107	33	3	241528	3033374	CHITAWAN
206	107	33	4	241828	3033074	CHITAWAN
207	107	33	5	241828	3033224	CHITAWAN

208	107	33	6	241828	3033374	CHITAWAN
209	108	36	1	245817	3044974	CHITAWAN
210	108	36	2	245817	3045124	CHITAWAN
211	108	36	3	245817	3045274	CHITAWAN
212	108	36	4	246117	3044974	CHITAWAN
213	108	36	5	246117	3045124	CHITAWAN
214	108	36	6	246117	3045274	CHITAWAN
215	110	33	1	253524	3032784	CHITAWAN
216	110	33	2	253524	3032934	CHITAWAN
217	110	33	3	253524	3033084	CHITAWAN
218	110	33	4	253824	3032784	CHITAWAN
219	110	33	5	253824	3032934	CHITAWAN
220	112	41	1	262296	3064581	CHITAWAN
221	112	41	2	262296	3064731	CHITAWAN
222	112	41	3	262296	3064881	CHITAWAN
223	112	41	4	262596	3064581	CHITAWAN
224	112	41	5	262596	3064731	CHITAWAN
225	112	41	6	262596	3064881	CHITAWAN
226	113	40	1	266198	3060486	CHITAWAN
227	113	40	2	266198	3060636	CHITAWAN
228	113	40	3	266198	3060786	CHITAWAN
229	113	40	4	266498	3060486	CHITAWAN
230	113	40	5	266498	3060636	CHITAWAN
231	113	40	6	266498	3060786	CHITAWAN
232	114	37	1	269906	3048393	CHITAWAN
233	114	37	2	269906	3048543	CHITAWAN
234	114	37	3	269906	3048693	CHITAWAN
235	114	37	4	270206	3048393	CHITAWAN
236	114	37	5	270206	3048543	CHITAWAN
237	114	37	6	270206	3048693	CHITAWAN
238	115	29	1	273132	3016305	PARSA
239	115	29	3	273132	3016605	PARSA
240	115	29	4	273432	3016305	PARSA
241	115	29	6	273432	3016605	PARSA
242	116	29	1	277131	3016209	PARSA
243	116	29	3	277131	3016509	PARSA
244	116	29	4	277431	3016209	PARSA
245	116	29	6	277431	3016509	PARSA
246	117	29	1	281129	3016112	PARSA
247	117	29	3	281129	3016412	PARSA
248	117	29	4	281429	3016112	PARSA
249	117	29	6	281429	3016412	PARSA
250	118	29	1	285128	3016015	PARSA

251	118	29	3	285128	3016315	PARSA
252	118	29	4	285428	3016015	PARSA
253	118	29	6	285428	3016315	PARSA
254	119	29	1	289127	3015919	PARSA
255	119	29	3	289127	3016219	PARSA
256	119	29	4	289427	3015919	PARSA
257	119	29	6	289427	3016219	PARSA
258	120	29	1	293126	3015822	PARSA
259	120	29	3	293126	3016122	PARSA
260	120	29	4	293426	3015822	PARSA
261	120	29	6	293426	3016122	PARSA
262	121	28	1	297028	3011726	PARSA
263	121	28	3	297028	3012026	PARSA
264	121	28	4	297328	3011726	PARSA
265	121	28	6	297328	3012026	PARSA
266	122	28	1	301027	3011630	BARA
267	122	28	3	301027	3011930	BARA
268	122	28	4	301327	3011630	BARA
269	122	28	6	301327	3011930	BARA
270	122	32	1	301414	3027625	BARA
271	122	32	6	301714	3027925	BARA
272	123	28	1	305026	3011533	BARA
273	123	28	3	305026	3011833	BARA
274	123	28	4	305326	3011533	BARA
275	123	28	6	305326	3011833	BARA
276	124	27	1	308928	3007438	BARA
277	124	27	3	308928	3007738	BARA
278	124	27	6	309228	3007738	BARA
279	124	32	1	309411	3027432	BARA
280	124	32	2	309411	3027582	BARA
281	124	32	4	309711	3027432	BARA
282	124	32	6	309711	3027732	BARA
283	125	25	1	312733	2999343	BARA
284	125	25	3	312733	2999643	BARA
285	125	25	4	313033	2999343	BARA
286	125	25	6	313033	2999643	BARA
287	125	28	1	313023	3011340	BARA
288	125	28	3	313023	3011640	BARA
289	125	28	4	313323	3011340	BARA
290	125	28	6	313323	3011640	BARA
291	126	26	1	316829	3003245	BARA
292	126	26	3	316829	3003545	BARA
293	126	26	4	317129	3003245	BARA

294	126	26	6	317129	3003545	BARA
295	127	25	1	320731	2999150	BARA
296	127	25	3	320731	2999450	BARA
297	127	25	4	321031	2999150	BARA
298	127	25	6	321031	2999450	BARA
299	128	26	1	324827	3003052	RAUTAHAT
300	128	26	4	325127	3003052	RAUTAHAT
301	128	26	6	325127	3003352	RAUTAHAT
302	129	26	1	328825	3002955	RAUTAHAT
303	129	26	3	328825	3003255	RAUTAHAT
304	129	26	4	329125	3002955	RAUTAHAT
305	129	26	6	329125	3003255	RAUTAHAT
306	130	24	3	332631	2995161	RAUTAHAT
307	130	27	1	332921	3006857	RAUTAHAT
308	130	27	3	332921	3007157	RAUTAHAT
309	130	27	4	333221	3006857	RAUTAHAT
310	130	27	6	333221	3007157	RAUTAHAT
311	132	24	1	340629	2994668	RAUTAHAT
312	132	24	3	340629	2994968	RAUTAHAT
313	132	24	4	340929	2994668	RAUTAHAT
314	132	24	6	340929	2994968	RAUTAHAT
315	133	26	1	344821	3002569	RAUTAHAT
316	133	26	3	344821	3002869	RAUTAHAT
317	133	26	6	345121	3002869	RAUTAHAT

Annex II: **List of Plots Selected for QAQC**

Cluster I								
SN	**col**	**row**	**plot**	**DISTRICT**	**Palika**	**plots**	**QAQC selection**	**Plot_no**
1	4	76	1	KANCHANPUR	Shuklaphanta Wildlife Reserve	3	Selected	1,4
2	7	80	1	KANCHANPUR	Bedkot	6	Selected	3,4
3	10	72	3	KANCHANPUR	Laljhadi	3	Selected	3,6
4	12	72	1	KANCHANPUR	Krishnapur	2	Selected	1,3
5	15	77	1	KAILALI	Chure	6	Selected	4,5
6	17	73	3	KAILALI	Chure	2	Selected	3,6
7	20	67	3	KAILALI	Kailari	3	Selected	4,6
8	22	69	1	KAILALI	Ghodaghodi	3	Selected	1,4
9	24	70	1	KAILALI	Ghodaghodi	3	Selected	1,6
10	30	69	1	KAILALI	Mohanyal	5	Selected	1,2
11	32	66	1	BARDIYA	Bardiya National Park	4	Selected	1,4
12	36	58	1	BARDIYA	Bansagadhi	4	Selected	1,3
13	39	58	1	BARDIYA	Bansagadhi	4	Selected	4,6
14	21	70	1	KAILALI	Ghodaghodi	1	Selected	1

Cluster II								
SN	**col**	**row**	**GaPa_NaPa**	**Type_GN**	**DAN**	**ward**	**status**	**Plot_no**
1	41	53	BANKE	Duduwa		5	Selected	1,3
2	43	54	BANKE	Rapti Sonari	BANKE NATIONAL PARK	8	Selected	3,6
3	45	52	BANKE	Rapti Sonari	BANKE NATIONAL PARK	2	Selected	4,6
4	50	53	DANG	Babai		7	Selected	1,4
5	54	51	DANG	Tulsipur		13	Selected	2,3
6	59	48	DANG	Ghorahi		5	Selected	4,6
7	66	46	DANG	Rapti		2	Selected	1,5
8	71	42	KAPILBASTU	Buddhabhumi		9	Selected	1,4
9	75	42	KAPILBASTU	Banganga		9	Selected	1,4
10	85	40	RUPANDEHI	Tillotama		1	Selected	1,4

11	98	41	NAWALPARASI	Hupsekot		2	Selected	3,4
12	107	33	CHITAWAN	Madi		8	Selected	1,3
13	113	40	CHITAWAN	Rapti		8	Selected	2,5
14	117	29	PARSA	Parsa Wildlife Reserve	PARSA WILDLIFE RESERVE	99	Selected	1,3
15	121	28	PARSA	Belwa		7	Selected	4,6
16	124	27	BARA	Jitpur Simara		1	Selected	1,3
17	126	26	BARA	Kolhabi		3	Selected	1,4
18	130	27	RAUTAHAT	Chandrapur		3	Selected	4,6
19	89	39	NAWALPARASI	Sunwal		6	Selected	4