Table A - C's and P's - Sugarcane
Percent Reduction in C or P Due to Management Practices
All Field Office, State of Hawaii and Pacific Basin
12/1/88

Practice Code	Practice Name	Slope Code 10 <10% Slopes <12% Slopes				Slope Code 20 10 - 20% Slopes 12 - 20% Slopes >12% Slopes				Slope Code 30 >20% Slopes			
		Uniform		Complex		Uniform		Complex		Uniform		Complex	
		C	P	C	P	C	P	C	P	C	P	C	P
	Management Practices												
1	Cross Slope Farming	--	20	--	20	--	10	--	10	--	5	--	5
2	Cross Slope Block Farming	--	47	--	47	--	30	--	30	--	22	--	22
3	Contour Farming	--	40	--	40	--	20	--	20	--	10	--	N/A
4	Contour Farming (with Furrows)	--	70	--	70	--	60	--	60	--	55	--	N/A
5	Crop Residue Use	20	--	20	--	20	--	20	--	20	--	20	--
6	Precision Till	25	--	25	--	25	--	25	--	25	--	25	--
7	Scheduled Harvesting	40	--	40	--	40	--	40	--	40	--	40	--
8	Volunteer Cover Crop:												
	All Field Offices, Except Pahala	20	--	20	--	20	--	20	--	20	--	20	--
	Pahala Field Office	11		11	--	11	--	11	--	11	--	11	--
9	Cover and Green Manure Crop:												
	All Field Offices, Except Pahala	20	--	20	--	20	--	20	--	20	--	20	--
	Pahala Field Office	11		11	--	11	--	11	--	11	--	11	--
10	Mulching	71	--	71	--	71	--	71	--	71	--	71	--
17	Chiseling and Subsoiling (Chiseling)	8	--	8	--	8	--	8	--	8	--	8	--
18	Chiseling and Subsoiling (Deep Plowing)	10	--	10	--	10	--	10	--	10	--	10	--
	Other Practices												
35	Permanent Vegetative Cover	90	--	90	--	90	--	90	--	90	--	90	--

N/A Not applicable or recommended for situation.

Documentation for
Table A - C's and P's - Sugarcane

The application of management-type conservation practices and treatments (hereafter referred to collectively as practices) would reduce sheet and rill or USLE erosion, more specifically the cover and management factor C or erosion control practice P factor values in the USLE equation. The figures shown on the subject erosion reduction table are percent reduction in C or P factor values due to a practice. The figures are shown as percentages in order that they be entered into the dBase III computer program that was developed to calculate reduction in USLE and ephemeral gully erosion.

Practices 1 through 10, 17, 18, and 35 are applicable on sugarcane. Practices 1, 2, 3, and 4 affect P factor values. The table shows the percent reduction in the base P value due to a specific practice. The base P value for sugarcane with no practices applied is 1.00. The P values with each practice for each slope category were derived from Section IC of the SCS Field Office Technical Guide (FOTG) or developed through discussions with SCS WNTC specialists specifically for FSA planning purposes. The P values with each practice, are assumed to be the same for uniform and complex slopes in each slope category unless otherwise indicated. The percent reduction in P was calculated as the difference in base P and the P with each practice, divided by the base P and multiplied by 100. For example, given the base P of 1.00 and assuming that the P with a specific practice was 0.80 the percent reduction was calculated as follows:

1.00 base P
- 0.80 P with practice
= 0.20 reduction in P

$$\frac{\text{0.20 reduction in P}}{\text{1.00 base P}} = 0.20 \times 100 = 20\% \text{ reduction in P}$$

Specific documentation notes related to practices 1, 2, 3, and 4 are listed below.

1. Cross Slope Farming - The P values with this treatment applied were derived from the FOTG Section IC TABLE 8.--Erosion Control Practice Factor, P, page 23. The following table shows the slope break used on Table 8 to determine the P value with the treatment, the reduction in P, and the % reduction in P for each slope category.

	Slope Category			
Item	<10% <12%	10 - 20% 12 - 20% >12%		>20%
Slope Break Used	7.1 - 12%	12.1 - 18%		18.1 - 24%
P Value with Treatment	0.80	0.90		0.95
Reduction in P	0.20	0.10		0.05
% Reduction in P	20%	10%		5%

2. Cross Slope Block Farming - The P values with this treatment applied were developed through discussions with SCS WNTC specialists specifically for FSA planning purposes. See Appendix 1 for documentation. The following table shows the slope break used to determine the P value with treatment, the reduction in P, and the % reduction in P for each slope category.

	Slope Category		
		10 - 20%	
	<10%	12 - 20%	
Item	<12%	>12%	>20%
Slope Break Used	7.1 - 12%	12.1 - 18%	18.1 - 24%
P Value with Treatment	0.53	0.70	0.78
Reduction in P	0.47	0.30	0.22
% Reduction in P	47%	30%	22%

3. Contour Farming - The P values with this practice were derived from the FOTG Section IC TABLE 8.--Erosion Control Practice Factor, P, page 23 and represent values for contour planting. The following table shows the slope break used on Table 8 to determine the P value with the practice applied, the reduction in P and the % reduction in P for each slope category. This practice is not applicable on sugarcane land with > 20% complex slopes.

	Slope Category		
		10 - 20%	
	<10%	12 - 20%	
Item	<12%	>12%	>20%
Slope Break Used	7.1 - 12%	12.1 - 18%	18.1 - 24%
P Value with Treatment	0.60	0.80	0.90
Reduction in P	0.40	0.20	0.10
% Reduction in P	40%	20%	10%

4. Contour Farming (with Furrows) - The P values with this practice were derived from the FOTG Section IC TABLE 8.--Erosion Control Practice Factor, P, page 23 and represent values for contour irrigation furrows. The following table shows the slope break used on Table 8 to determine the P value with the practice applied, the reduction in P and the % reduction in P for each slope category. This practice is not applicable on sugarcane land with > 20% complex slopes.

	Slope Category		
		10 - 20%	
	<10%	12 - 20%	
Item	<12%	>12%	>20%
Slope Break Used	7.1 - 12%	12.1 - 18%	18.1 - 24%
P Value with Treatment	0.30	0.40	0.45
Reduction in P	0.70	0.60	0.55
% Reduction in P	70%	60%	55%

Practices 5 - 10, 17, 18, and 99 affect C factor values. Specific documentation notes related to each of these practices are listed below.

5. Crop Residue Use - At the present time, crop residue use on sugarcane meets the existing Standards and Specifications (Code 344) and the Additional Specifications on page 13 only as practiced in the Pahala Field Office area and on seed cane fields at other field office areas. With the application of crop residue use, base C factor values would be reduced by an estimated 20 percent. This reduction would apply to all slopes and conditions. See Appendix 2 for documentation regarding this estimate.

6. Precision Till - Application of this treatment on sugarcane according the Standards on page 14 would reduce base C values by an estimated 25 percent. This reduction would apply to all slopes and conditions. See Appendix 4 for documentation regarding this estimate.

7. Scheduled Harvesting - Implementation of scheduled harvesting on sugarcane would involve converting crops which are planted and harvested during the high rainfall periods (winter or fall crops) to the low rainfall period or to a summer crop. The application of this treatment would reduce sugarcane base C factors by an estimated 40 percent. This reduction would apply to all slopes and conditions. The estimate was based on the following:

   Assuming that a sugarcane winter or fall plant crop would be converted to a summer crop. The reduction in C was based on converting 36 month, dryland sugarcane on the island of Hawaii from a winter plant crop with a C of 0.15 to a summer plant crop with a C of 0.09. (Figures from FOTG Section IC TABLE 3.—C Values for Sugarcane, page 20) The percent reduction in C was calculated as the difference in the winter crop C and the summer crop C, divided by the winter crop C and multiplied by 100, as shown below:

   0.15 winter crop C
   - 0.09 summer crop C
   = 0.06 reduction in C

   $$\frac{\text{0.06 reduction in C}}{\text{0.15 winter crop C}} = 0.40 \times 100 = 40\% \text{ reduction in C}$$

8. Volunteer Cover Crop - Application of this treatment on sugarcane at all field office locations, except Pahala, would reduce base C factor values by an estimated 20 percent. Application of this treatment at the Pahala Field Office would reduce base C factor values by an estimated 11 percent. See Appendix 5 for documentation regarding these estimates.

9. Cover and Green Manure Crop - Application of this practice on sugarcane at all field office locations, except Pahala, would reduce base C factor values by an estimated 20 percent. Application of this treatment at the Pahala Field Office would reduce base C factor values by an estimated 11 percent. See Appendix 5 for documentation regarding these estimates.

10. Mulching - Application of this practice on sugarcane would most likely involve using sugarcane bagasse as a mulch. The reduction in C was based on applying organic mulch on 36 month, irrigated sugarcane summer plant crop which has a base C value of 0.07 and is the lowest C for all the types of crops on the island of Hawaii. (See FOTG Section IC TABLE 3.—C Values for Sugarcane, page 20) TABLE 7.--Values of Ground Cover for Erosion Control on Construction Sites on page 23 of the FOTG Section IC includes a C factor value of 0.02 for bagasse mulch applied at 2 tons per acre. The percent reduction in C can be calculated as the difference in the base C and the C for bagasse mulch, divided by the base C and multiplied by 100, as shown below:

0.07 base C
- 0.02 C for bagasse mulch
= 0.05 reduction in C

$$\frac{0.05 \text{ reduction in C}}{0.07 \text{ base C}} = 0.7142 \times 100 = 71.42\% \text{ reduction in C}$$

or 71% rounded to nearest 1%

A 71% reduction in C will be used for organic mulch for all slopes and conditions.

17. Chiseling and Subsoiling (Chiseling) - Application of this practice according to Code 324 Standards and Specifications would reduce sugarcane C factor values by an estimated 8 percent assuming that this practice is slightly less effective than subsoiling (deep plowing). This reduction would apply to all slopes and conditions.

18. Chiseling and Subsoiling (Deep Plowing) - Application of this practice according to Code 324 Standards and Specifications would reduce sugarcane C factor values by an estimated 10 percent. This reduction would apply to all slopes and conditions. See Appendix 6 for documentation regarding this estimate.

35. Permanent Vegetative Cover - The 90% reduction in C due to this practice was based on the assumption that application of this practice would result in 95-100% ground cover, no appreciable canopy, 50% grass and 50% weeds or broadleaf herbaceous plants. The FOTG Section IC TABLE 5.--C Values for Permanent Pasture and Idle Land, page 21 shows C values based on the above assumption of 0.003 for grass and 0.011 for weeds. These two values were averaged to get a C value of 0.007, which was used to represent the C value with this practice applied. The reduction in C was based on applying this practice on 36 month, irrigated sugarcane summer plant crop on the island of Hawaii which has a base C value of 0.07 and is the lowest C for all the islands. (See FOTG Section IC TABLE 3.--C Values for Sugarcane, page 20) The percent reduction in C can be calculated as the difference in the base C and the C with practice applied, divided by the base C and multiplied by 100, as shown below:

0.070 base C
- 0.007 C with practice
= 0.063 reduction in C

$$\frac{0.063 \text{ reduction in C}}{0.070 \text{ base C}} = 0.90 \times 100 = 90\% \text{ reduction in C}$$

A 90% reduction in C will be used for this practice for all slopes and conditions.

Table B-1 - C Combinations - Sugarcane
Percent Reduction in C Due to Combinations of Management Practices
All Field Offices, State of Hawaii and Pacific Basin, Except Pahala
12/1/88

Practice Combination Code	Consisting of the Following Practices: Codes	Names	Percent Reduction in C All Slopes and Conditions	Effect	% Reduction Per Practice: A	B	C	D
41	5, 6	Crop Residue Use, Precision Till	40	Cumulative	20	25		
42	5, 7	Crop Residue Use, Scheduled Harvesting	52	Cumulative	20	40		
43	5, 8	Crop Residue Use, Volunteer Cover Crop	36	Cumulative	20	20		
44	5, 17	Crop Residue Use, Chiseling	26	Cumulative	20	8		
45	5, 18	Crop Residue Use, Deep Plowing	28	Cumulative	20	10		
46	6, 7	Precision Till, Scheduled Harvesting	55	Cumulative	25	40		
47	6, 8	Precision Till, Volunteer Cover Crop	40	Cumulative	25	20		
48	6, 9	Precision Till, Cover and Green Manure Crop	40	Cumulative	25	20		
49	6, 10	Precision Till, Mulching	78	Cumulative	25	71		
50	7, 8	Scheduled Harvesting, Volunteer Cover Crop	52	Cumulative	40	20		
51	7, 9	Scheduled Harvesting, Cover and Green Manure Crop	52	Cumulative	40	20		
52	7, 10	Scheduled Harvesting, Mulching	83	Cumulative	40	71		
53	7, 17	Scheduled Harvesting, Chiseling	45	Cumulative	40	8		
54	7, 18	Scheduled Harvesting, Deep Plowing	46	Cumulative	40	10		
55	8, 17	Volunteer Cover Crop, Chiseling	26	Cumulative	20	8		
56	8, 18	Volunteer Cover Crop, Deep Plowing	28	Cumulative	20	10		

Table B-1 - C Combinations - Sugarcane
Percent Reduction in C Due to Combinations of Management Practices
All Field Offices, State of Hawaii and Pacific Basin, Except Pahala
12/1/88

Practice Combination Code	Consisting of the Following Practices: Codes	Names	Percent Reduction in C All Slopes and Conditions	Effect	% Reduction Per Practice: 1	2	3	4
57	9, 17	Cover and Green Manure Crop, Chiseling	20	9 credit only	20	8		
58	9, 18	Cover and Green Manure Crop, Subsoiling (Deep Plowing)	20	9 credit only	20	10		
59	10, 17	Mulching, Chiseling	71	10 credit only	71	8		
60	10,18	Mulching, Deep Plowing	71	10 credit only	71	10		
61	5, 6, 7	Crop Residue Use, Precision Till, Scheduled Harvesting	64	All cumulative	20	25	40	
62	5, 6, 8	Crop Residue Use, Precision Till, Volunteer Cover Crop	52	All cumulative	20	25	20	
63	5, 7, 8	Crop Residue Use, Scheduled Harvesting, Volunteer Cover Crop	62	All cumulative	20	40	20	
64	5, 7, 17	Crop Residue Use, Scheduled Harvesting, Chiseling	56	All cumulative	20	40	8	
65	5, 7, 18	Crop Residue Use, Scheduled Harvesting, Deep Plowing	57	All cumulative	20	40	10	
66	5, 8, 17	Crop Residue Use, Volunteer Cover Crop, Chiseling	41	All cumulative	20	20	8	
67	5, 8, 18	Crop Residue Use, Volunteer Cover Crop, Deep Plowing	42	All cumulative	20	20	10	
68	6, 7, 8	Precision Till, Scheduled Harvesting, Volunteer Cover Crop	64	All cumulative	25	40	20	

Table B-1 - C Combinations - Sugarcane
Percent Reduction in C Due to Combinations of Management Practices
All Field Offices, State of Hawaii and Pacific Basin, Except Pahala
12/1/88

Practice Combination Code	Consisting of the Following Practices: Codes	Names	Percent Reduction in C All Slopes and Conditions	Effect	% Reduction Per Practice: 1	2	3	4
69	6, 7, 9	Precision Till, Scheduled Harvesting, Cover and Green Manure Crop	64	All cumulative	25	40	20	
70	7, 8, 17	Scheduled Harvesting, Volunteer Cover Crop, Chiseling	56	All cumulative	40	20	8	
71	7, 8, 18	Scheduled Harvesting, Volunteer Cover Crop, Deep Plowing	57	All cumulative	40	20	10	
72	7, 9, 17	Scheduled Harvesting, Cover and Green Manure Crop, Chiseling	52	7&9 cumulative 9&17-9 only	40	20	8	
73	7, 9, 18	Scheduled Harvesting, Cover and Green Manure Crop, Deep Plowing	52	7&9 cumulative 9&18-9 only	40	20	10	
74	7, 10, 17	Scheduled Harvesting, Mulching, Chiseling	83	7&10 cumulative 10&17-10 only	40	71	8	
75	7, 10, 18	Scheduled Harvesting, Mulching, Deep Plowing	83	7&10 cumulative 10&18-10 only	40	71	10	
76	5, 6, 7, 8	Crop Residue Use, Precision Till, Scheduled Harvesting, Volunteer Cover Crop	71	All cumulative	20	25	40	20
77	5, 7, 8, 17	Crop Residue Use, Scheduled Harvesting, Volunteer Cover Crop, Chiseling	65	All cumulative	20	40	20	8
78	5, 7, 8, 18	Crop Residue Use, Scheduled Harvesting, Volunteer Cover Crop, Deep Plowing	65	All cumulative	20	40	20	10

Table B-2 - C Combinations - Sugarcane
Percent Reduction in C Due to Combinations of Management Practices
Pahala Field Office, State of Hawaii
12/1/88

Practice Combination Code	Consisting of the Following Practices: Codes	Names	Percent Reduction in C All Slopes and Conditions	Effect	% Reduction Per Practice: A	B	C	D
141	5, 6	Crop Residue Use, Precision Till	40	Cumulative	20	25		
142	5, 7	Crop Residue Use, Scheduled Harvesting	52	Cumulative	20	40		
143	5, 8	Crop Residue Use, Volunteer Cover Crop	29	Cumulative	20	11		
144	5, 17	Crop Residue Use, Chiseling	26	Cumulative	20	8		
145	5, 18	Crop Residue Use, Deep Plowing	28	Cumulative	20	10		
146	6, 7	Precision Till, Scheduled Harvesting	55	Cumulative	25	40		
147	6, 8	Precision Till, Volunteer Cover Crop	33	Cumulative	25	11		
148	6, 9	Precision Till, Cover and Green Manure Crop	33	Cumulative	25	11		
149	6, 10	Precision Till, Mulching	78	Cumulative	25	71		
150	7, 8	Scheduled Harvesting, Volunteer Cover Crop	47	Cumulative	40	11		
151	7, 9	Scheduled Harvesting, Cover and Green Manure Crop	47	Cumulative	40	11		
152	7, 10	Scheduled Harvesting, Mulching	83	Cumulative	40	71		
153	7, 17	Scheduled Harvesting, Chiseling	45	Cumulative	40	8		
154	7, 18	Scheduled Harvesting, Deep Plowing	46	Cumulative	40	10		
155	8, 17	Volunteer Cover Crop, Chiseling	18	Cumulative	11	8		
156	8, 18	Volunteer Cover Crop, Deep Plowing	20	Cumulative	11	10		

Table B-2 - C Combinations - Sugarcane
Percent Reduction in C Due to Combinations of Management Practices
Pahala Field Office, State of Hawaii
12/1/88

Practice Combination	Consisting of the Following Practices		Percent Reduction in C All Slopes and Conditions		% Reduction Per Practice			
Code	Codes	Names		Effect	1	2	3	4
157	9, 17	Cover and Green Manure Crop, Chiseling	11	9 credit only	11	8		
158	9, 18	Cover and Green Manure Crop, Subsoiling (Deep Plowing)	11	9 credit only	11	10		
159	10, 17	Mulching, Chiseling	71	10 credit only	71	8		
160	10,18	Mulching, Deep Plowing	71	10 credit only	71	10		
161	5, 6, 7	Crop Residue Use, Precision Till, Scheduled Harvesting	64	All cumulative	20	25	40	
162	5, 6, 8	Crop Residue Use, Precision Till, Volunteer Cover Crop	47	All cumulative	20	25	11	
163	5, 7, 8	Crop Residue Use, Scheduled Harvesting, Volunteer Cover Crop	57	All cumulative	20	40	11	
164	5, 7, 17	Crop Residue Use, Scheduled Harvesting, Chiseling	56	All cumulative	20	40	8	
165	5, 7, 18	Crop Residue Use, Scheduled Harvesting, Deep Plowing	57	All cumulative	20	40	10	
166	5, 8, 17	Crop Residue Use, Volunteer Cover Crop, Chiseling	34	All cumulative	20	11	8	
167	5, 8, 18	Crop Residue Use, Volunteer Cover Crop, Deep Plowing	36	All cumulative	20	11	10	
168	6, 7, 8	Precision Till, Scheduled Harvesting, Volunteer Cover Crop	60	All cumulative	25	40	11	

Table B-2 - C Combinations - Sugarcane
Percent Reduction in C Due to Combinations of Management Practices
Pahala Field Office, State of Hawaii
12/1/88

Practice Combination Code	Consisting of the Following Practices: Codes	Names	Percent Reduction in C All Slopes and Conditions	Effect	% Reduction Per Practice: 1	2	3	4
169	6, 7, 9	Precision Till, Scheduled Harvesting, Cover and Green Manure Crop	60	All cumulative	25	40	11	
170	7, 8, 17	Scheduled Harvesting, Volunteer Cover Crop, Chiseling	51	All cumulative	40	11	8	
171	7, 8, 18	Scheduled Harvesting, Volunteer Cover Crop, Deep Plowing	52	All cumulative	40	11	10	
172	7, 9, 17	Scheduled Harvesting, Cover and Green Manure Crop, Chiseling	47	7&9 cumulative 9&17-9 only	40	11	8	
173	7, 9, 18	Scheduled Harvesting, Cover and Green Manure Crop, Deep Plowing	47	7&9 cumulative 9&18-9 only	40	11	10	
174	7, 10, 17	Scheduled Harvesting, Mulching, Chiseling	83	7&10 cumulative 10&17-10 only	40	71	8	
175	7, 10, 18	Scheduled Harvesting, Mulching, Deep Plowing	83	7&10 cumulative 10&18-10 only	40	71	10	
176	5, 6, 7, 8	Crop Residue Use, Precision Till, Scheduled Harvesting, Volunteer Cover Crop	68	All cumulative	20	25	40	11
177	5, 7, 8, 17	Crop Residue Use, Scheduled Harvesting, Volunteer Cover Crop, Chiseling	61	All cumulative	20	40	11	8
178	5, 7, 8, 18	Crop Residue Use, Scheduled Harvesting, Volunteer Cover Crop, Deep Plowing	62	All cumulative	20	40	11	10

Documentation for Tables B-1 and B-2 - C Combinations - Sugarcane

In the Alternative Conservation Systems (ACS's) develope for sugarcane practices and treatments 5 - 10, 17 and 18 were used in various combinations and with other management and structural practices. Practices and treatments will hereafter be referred to as practices. Practices 1, 2, 3, and 4 are mutually exclusive and were not used in combination with each other. Practice 35 was not included in the ACS's, rather it is listed as an alternative to applying an ACS listed on the guidesheets.

The effect on C factor values when practices 5 -10, 17 and 18 were used in combination were based on the following general assumptions:

1. Overlapping Practices - In some instances the effects of one practice will lessen the effectiveness of another practice. If this situation exits, then credit for only one of the practices was used. For example: Practice Combination Code 57, includes practice 9 - Cover and Green Manure Crop and 17 - Chiseling and Subsoiling (Chiseling). Cover and Green Manure Crop reduces C by 20% and Chiseling reduces C by 8%. Cover and Green Manure Crop affects ground cover canopy and Chiseling affects soil infiltration. In order to be used in combination with each other, chiseling would have to be done first before the cover crop could be planted. The effectiveness of chiseling would be lessened by the cover crop and credit was therefore claimed for the cover crop only.
2. Cumulative Practices - When practices used in combination do not contribute to solving the same erosion problem, the effect of each practice was assumed to be cumulative. The following equation was used to determine the cumulative effect of such practices:

$$\text{Cumulative \%Reduction in C} = 100 - \left[100 \times \left(1 - \frac{\text{\% reduction Practice A}}{100} \right) \times \left(1 - \frac{\text{\% reduction Practice B}}{100} \right) \right]$$

For example: Practice Combination Code 41, includes practice 5 - Crop Residue Use and 6 - Precision Till. Crop Residue Use reduces C by 20% and Precision Till reduces C by 25%. Crop Residue Use effects ground cover and Precision Till effects soil infiltration. The cumulative reduction in C using the above equation is shown on the following page.

$$\text{Cumulative \%Reduction in C} = 100 - \left[100 \times \left[1 - \frac{20}{100}\right] \times \left[1 - \frac{25}{100}\right]\right]$$

$$= 100 - \left[100 \times \left[1 - .2\right] \times \left[1 - .25\right]\right]$$

$$= 100 - \left[100 \times \left[.8\right] \times \left[.75\right]\right]$$

$$= 100 - \left[100 \times .6\right]$$

$$= 100 - \left[60\right]$$

$$= 40$$

Table B-1 shows all the practice combinations for sugarcane and the percent reduction in C for each combination for all Field Offices, except Pahala. Table B-2 shows similiar information for the Pahala Field Office. A separate table was prepared for Pahala because the reduction in C values for two practices, 8 - Volunteer Cover Crop and 9 - Cover and Green Manure Crop is different for this field office. The Effect column on the right side of the tables show whether the effects of the practices are cumulative or not. If the effects are not cumulative, then the practice that is given credit is shown. The far right columns of the tables show the percent reduction in C for each of the practices in each combination.

Table C - Ephemeral Gully Erosion - Sugarcane
Percent Reduction in Ephemeral Gully Erosion Due to Structural Practices
All Field Offices, State of Hawaii and Pacific Basin
12/1/88

Practice Code	Practice Name	Slope Code 10: <10% Slopes <12% Slopes — Uniform	Slope Code 10: <10% Slopes <12% Slopes — Complex	Slope Code 20: 10 - 20% Slopes 12 - 20% Slopes >12% Slopes — Uniform	Slope Code 20: 10 - 20% Slopes 12 - 20% Slopes >12% Slopes — Complex	Slope Code 30: >20% Slopes — Uniform	Slope Code 30: >20% Slopes — Complex
20	Grassed Waterway 1/	0	N/A	0	N/A	0	N/A
21	Watercourse	N/A	30	N/A	30	N/A	30
22	Diversion	30	25	30	15	30	15
23	Diversion for (Outside Water)	10	10	20	20	40	20
24	Terrace (Gradient)	80	80	80	80	80	80
25	Access Road	20	20	20	20	20	20
26	Grade Stabilization Structure 1/	0	0	0	0	0	0
29	Terrace (Gradient 100' Spacing)	80	80	80	80	80	80
31	Terrace (Level)	80	N/A	80	N/A	N/A	N/A
32	Field Windbreak 2/	0	0	0	0	0	0

N/A Not applicable or recommended for situation.

1/ No ephemeral gully erosion savings is shown for this practice because savings credited to other practices, such as diversions or gradient terraces, used in conjunction with this practice. Erosion savings may be claimed for this practice if ephemeral gully erosion is taking place at the site of practice construction.

2/ No erosion savings is shown for this practice because a wind erosion equation (WEQ) has not been developed for Hawaii at the present time.

Documentation for Table C - Ephemeral Gully Erosion - Sugarcane

Limited field tests conducted at the Papaaloa Suboffice have indicated that ephemeral gully erosion is approximately equal to sheet and rill erosion. For example, if sheet and rill erosion is 10 tons/acre/year as measured by the USLE, then ephemeral gully erosion is approximately 10 tons/acre/year. Thus, for FSA planning purposes a 1:1 ratio was used to calculate an ephemeral gully erosion index value which is used as a starting value to then evaluate the percent reduction in ephemeral gully erosion due to structural practices and treatments (hereafter referred to collectively to as practices). Ephemeral gully erosion was expressed as an index rather than an actual erosion rate because sufficient data has not been collected and analyzed in order to make a reliable estimate of the actual amount of ephemeral gully erosion taking place in the field.

Structural practices 20, 21, 22, 23, 24, 25, 26, 29, 31, and 32 are applicable on sugarcane land. Specific documentation notes related to the percent reduction in ephemeral gully erosion due to these practices are listed below.

20. Grassed Waterway - This practice is used to provide an outlet for other structural practices such as terraces and diversions for outside water in situations where an suitable natural outlet is not available. This practice does not in itself reduce ephemeral gully eroaion in any measurable way, thus no erosion reduction credit is claimed.

21. Watercourse - The 30% reduction in ephemeral gully erosion due to this treatment is based on the assumptions that 50% of the ephemeral gullies in a particular field would be maintained as watercourses and that the ephemeral gully erosion in these maintained watercourses would be reduced by 60%. This would result in an overall reduction in ephemeral gully erosion of 30% (50% x 60% = 30%). See Appendix 9.

22. Diversion - The percent reduction in ephemeral gully erosion due to this practice for the different slopes and conditions was developed through discussions with WNTC specialists. See Appendix 10.

23. Diversion (for Outside Water) - The percent reduction in ephemeral gully erosion due to this practice was developed through discussions with WNTC specialists. See Appendix 10.

24. Terrace (Gradient)- A system of gradient terraces installed to specifications will control 100% of the ephemeral gully erosion on the approximately 80% of the total land area in sugarcane (assuming 20% in roads). Thus, this practice is assumed to control 80% of the total ephemeral gully erosion.

25. Access Road - Measures to properly control runoff on access roads will control 100% of the ephemeral gully erosion on the approximately 20% of the total land area in roads (assuming 80% in sugarcane). Thus, this practice is assumed to control 20% of the total ephemeral gully erosion.

26. Grade Stabilization Structure - This practice does not in itself reduce ephemeral gully erosion in any measurable way, thus no erosion reduction credit is claimed.

29. Terrace (Gradient 100' Spacing) - A system of these smaller closely-spaced gradient terraces meet the capacity requirements outlined in the regular gradient terrace specifications. Thus, this type of terrace system is assumed to have the same erosion control benefits as a regular gradient terraces, which will control 100% of the ephemeral gully erosion on the approximately 80% of the total land area in sugarcane (assuming 20% in roads). Thus, this practice is assumed to control 80% of the total ephemeral gully erosion.

31. Terrace (Level) - Level terraces installed to specifications will control 100% of the ephemeral gully erosion on the approximately 80% of the total land area in crops (assuming 20% in roads). Thus, this practice is assumed to control 80% of the total ephemeral gully erosion.

32. Field Windbreak - No erosion savings is shown for this practice because data needed to use the wind erosion equation (WEQ) is not available in Hawaii at the present time.

Table D - USLE Erosion - Sugarcane
Percent Reduction in USLE Erosion Due to Structural Practices
All Field Offices, State of Hawaii and Pacific Basin
12/1/88

Practice Code	Practice Name	Percent Reduction in USLE Erosion All Slopes and Conditions
22	Diversion	8
24	Terrace (Gradient)	15
29	Terrace (Gradient 100' Spacing)	30
31	Terrace (Level)	15

Documentation for
Table D - USLE Erosion - Sugarcane

Structural practices and treatments are installed primarily for ephemeral gully erosion control. Practices and treatments will hereafter be referred to collectively as practices. In instances where structural practices also reduce slope length, it is assumed that these structural practices would also reduce sheet and rill erosion. USLE erosion reduction credit is claimed for the following practices used on sugarcane: 22 - Diversion, 24 - Terrace (Gradient), 29 - Terrace (Gradient 100' Spacing), and 31 - Terrace (Level). Documentation regarding the percent erosion reduction credit claimed for each practice follows.

22. Diversion - Appendix 7 is documentation for USLE erosion reduction for structural practices. Correspondence to Stanley Hobson, Director SCS WNTC, dated April 14, 1988 and response from Hobson to Richard N. Duncan, SCS Hawaii State Conservationist, dated April 28, 1988, discuss proposed methodology for calculating USLE reduction for terraces and diversions. Concurrence to proceed with proposal was given by Clarence Maesner, Head ECS, SCS, WNTC to Herb Lyford, SCS Hawaii FSA Program Coordinator during followup phone conversation. Approval to use a 12.5% reduction for diversions was given, however only a 8% reduction was used following further discussion between SCS Hawaii specialists.

24. Terrace (Gradient) - Appendix 7 also covers documentation for this practice. Approval to use a 25% reduction for diversions was given, however only a 15% reduction was used following further discussion between SCS Hawaii specialists.

29. Terrace (Gradient 100' Spacing) - In instances where terrace interval is less than the slope length, the terrace interval is used for the "L" value in the USLE calculations. Appendix 8 is documentation for how USLE credit for gradient terraces determined. The average reduction of 30% reduction in USLE for gradient terrace 100' spacing was used.

31. Terrace (Level) - Appendix 7 also covers documentation for this practice. Approval to use a 25% reduction for diversions was given, however only a 15% reduction was used following further discussion between SCS Hawaii specialists.