Chapter VIII.—CONVERSION FACTORS

391. Purpose of conversion factors

A respondent may not always be able to give you information in the units of measure required for the agriculture questionnaire. In such cases, you will need to convert his figures to the required unit on the basis of the conversion factors in this chapter.

392. How to use conversion factors

In most cases, when you need to use conversion factors, you will either multiply or divide the respondent's figure by the appropriate conversion factor to get the entry in the unit required for the questionnaire. Following are a few examples of how to use the factors:

1. For question 10a, an operator reports 450 bushels of ear corn. Looking at the conversion factors given for question 10, corn, you find that 2 bushels of ear corn are equal to one bushel of shelled corn. In this case, you would divide the respondent's figure of 450 by 2 and you would enter the result, 225, in question 10a for bushels of corn for grain.
2. For question 33, an operator reports 12½ tons of barley. The conversion factor for barley says there are 48 pounds to a bushel. Twelve and one-half tons are equal to 25,000 pounds. Dividing 25,000 by 48, you get 520.8 bushels. You would round this result and enter 521 on the questionnaire for the quantity of barley harvested.
3. For question 165, an operator reports he harvested 500 boxes of apples. First you would need to find out the kind of box he is referring to and what is the weight per box. Then you would multiply the pounds per box by the number of boxes. Suppose each box weighed 44 pounds:

   500 boxes × 44 lb. = 22,000 lb.

In this case, you would enter 22,000 on the questionnaire for pounds of apples harvested.

393. Conversion factors for corn

Corn:

56 lb. shelled corn	= 1 bu. shelled corn.
70 lb. ear corn, husked	= 1 bu. shelled corn.
2 leveled bushel baskets of ear corn, or 1½ heaped baskets	= 1 bu. shelled corn.
6 leveled bushel baskets of corn in the husk, or 4 heaped bushel baskets	= 1 bu. shelled corn.
1 barrel of corn usually (In some areas, 1 barrel = 2 to 3 bu. shelled basis.)	= 5 bu. shelled basis.

To measure corn in a crib:

1 bu. of ear corn (70 lb.) occupies about 2½ cu. ft.

To find the number of bushels of shelled corn in a rectangular crib filled with ear corn use: 0.4 × length × width × average depth in feet = bushels. Suppose the crib is 18 feet long and 12 feet wide and filled with ear corn to an average depth of 8 feet. The problem is worked like this:

$$0.4 \times 18 \times 12 \times 8 = 691 \text{ bushels.}$$

To find the number of bushels of shelled corn or grain in a rectangular bin use: 0.8 × length × width × average depth in feet = bushels. Suppose the crib is 18 feet long and 12 feet wide. It's filled with shelled corn to an average depth of 8 feet. The problem is worked like this:

$$0.8 \times 18 \times 12 \times 8 = 1{,}382 \text{ bushels.}$$

For a **round bin** use the table below.

If the corn is shelled, read the bushels from the table. If it is ear corn, divide the bushels given in the table by 2. For example, a round bin is 14 ft. in diameter and has ear corn to a depth of 10 ft., report 600 bushels of shelled corn (1,200 ÷ 2 = 600).

If wet (30 to 40 percent moisture) shelled corn has been put in a round **silo**, multiply the bushels given in the table by 0.75. If wet (30 to 40 percent moisture) ear corn has been put in a round **silo**, divide the bushels given in the table by 2 and multiply by 0.75. For example, a silo 14 ft. in diameter has high moisture ear corn to a depth of 10 ft.; report 450 bushels of shelled corn (1,200 ÷ 2 × 0.75 = 450).

ESTIMATED BUSHEL CAPACITY IN TERMS OF NO. 2 SHELLED CORN (15.5 PERCENT MOISTURE) FOR SELECTED SIZES OF CYLINDRICAL STORAGE STRUCTURES

Diameter in feet	Height in feet								
	10	15	20	25	30	35	40	45	50
	Bushels of shelled corn								
14	1,200	1,800	2,500	3,100	3,700	4,300	4,900	5,500	6,200
16	1,600	2,400	3,200	4,000	4,800	5,600	6,400	7,200	8,000
18	2,000	3,000	4,100	5,100	6,100	7,100	8,100	9,100	10,200
20	2,500	3,800	5,000	6,300	7,500	8,800	10,000	11,300	12,600
22	3,000	4,600	6,100	7,600	9,100	10,600	12,200	13,700	15,200
24	3,600	5,400	7,200	9,000	10,900	12,700	14,500	16,300	18,100
26	4,200	6,400	8,500	10,600	12,700	14,800	17,000	19,100	21,200
28	4,900	7,400	9,900	12,300	14,800	17,300	19,700	22,200	24,700
30	5,700	8,500	11,300	14,200	17,000	19,800	22,600	25,500	28,300

394. Conversion factors for sorghums

Sorghums:

56 lb. of sorghum grain	=	1 bu.
1 ton of heads	=	25 bu. of grain.

395. Conversion factors for silage

Silage:

If necessary to estimate the quantity of silage harvested, first find out what type of silo the farm operator has. Then estimate the total quantity of silage for each type of silo according to the following instructions:

Upright silos. Ask the operator for the depth of the silage when placed in the silo and for the inside diameter of the silo. Match depth with diameter in the following table to find the approximate tons of silage. For example, if a farmer reports silage to be 30 feet deep in a silo with a 14-foot diameter, you would enter 91 tons of silage on his questionnaire.

Silage Storage: Approximate Capacity of Cylindrical Silos

(Use height of silage after setting 2 days)

Depth of silage (feet)	Inside diameter of silo, in feet										
	10	12	14	16	18	20	22	24	26	28	30
	Capacity, tons										
10	10	15	20	26	33	41	50	59	69	80	92
15	18	25	34	45	57	70	85	101	119	138	158
16	19	28	38	49	62	77	93	110	130	150	172
17	21	30	41	53	67	83	101	120	141	163	187
18	23	32	44	58	73	90	109	130	152	177	203
19	24	35	48	62	79	97	118	140	164	191	219
20	26	38	51	67	85	105	127	151	177	205	235
21	28	40	55	72	91	112	135	161	189	219	252
22	30	43	59	77	97	120	145	172	202	234	269
23	32	46	63	82	103	128	154	184	216	250	287
24	34	49	66	87	110	135	164	195	229	265	305
25	36	52	70	92	116	143	173	206	242	281	323
26	38	55	74	97	123	152	184	219	257	298	342
27	40	58	79	103	130	160	194	231	271	314	361
28	42	61	83	108	137	169	204	243	285	331	380
29	44	64	87	114	144	178	215	256	300	348	400
30	47	67	91	119	151	187	226	269	315	366	420
31	49	70	96	125	158	195	236	281	330	383	439
32	51	74	100	131	166	205	248	295	346	401	460
33	53	77	105	138	173	214	258	308	361	419	481
34	56	80	109	143	181	224	270	321	377	438	502
35	58	84	114	149	188	232	281	335	393	456	523
36	61	87	118	155	196	242	293	349	409	474	545
37	63	91	123	161	204	252	305	362	425	493	566
38	65	94	128	167	212	261	316	376	442	512	588
39	68	98	133	174	220	271	328	391	459	532	611
40	70	101	138	180	228	281	341	405	476	552	633
41	73	105	143	187	236	292	353	420	493	572	656
42	76	109	148	194	245	302	366	435	511	592	680
43	78	113	153	200	253	313	378	450	529	613	704
44	81	116	159	207	262	323	391	466	547	634	728
45	84	120	164	214	271	334	405	481	565	655	752
46	86	124	169	221	280	345	418	497	583	677	777
47	89	128	175	228	289	357	431	514	603	699	802
48	92	132	180	235	298	368	445	530	622	721	828
49	95	137	186	243	307	380	459	546	641	744	854
50	98	141	192	250	317	391	473	563	661	765	880
51		145	197	257	326	402	487	579	680	788	905
52		149	203	265	335	413	500	595	699	810	930
53		153	208	272	344	425	514	611	718	832	955
54		157	214	279	353	436	528	628	737	855	981
55		161	219	286	363	448	542	644	756	877	1,007
56			225	294	372	459	556	661	776	900	1,033
57			231	301	381	471	570	678	796	923	1,060
58			237	309	391	483	584	695	816	946	1,086
59			243	317	401	495	599	713	836	970	1,114
60			248	324	410	506	612	729	855	992	1,139

Pit, trench, or bunker silos:

40 lb. of silage occupies 1 cubic foot.

1 ton of silage occupies 50 cubic feet.

To find the number of tons of silage per silo use: length × average width × average depth × .02. For example, a farmer has a trench silo 60 feet long, an average of 12 feet wide, and an average of 6 feet deep, report 86 tons (60 × 12 × 6 × .02 = 86).

396. Conversion factors for soybeans, cowpeas, and peanuts

	Pounds per bushel
Soybeans	60
Cowpeas	60
Peanuts (unshelled):	
Virginia type	17
Runners, Southeastern	21
Spanish	25
Velvetbeans (hulled)	60

397. Conversion factors for wheat and other small grains

Wheat, 60 lb.	= 1 bu.
Oats, 32 lb.	= 1 bu.
Barley, 48 lb.	= 1 bu.
Rye, 56 lb.	= 1 bu.
Flaxseed, 56 lb.	= 1 bu.
Rice:	
45 lb. (dry weight)	= 1 bu.
162 lb. (dry weight)	= 1 barrel.
3-3/5 bu. (dry weight)	= 1 barrel.
100 lb. (California) (dry weight)	= 1 bag.
Emmer and spelt, 40 lb.	= 1 bu.
Proso millet, 48-50 lb.	= 1 bu.
Buckwheat, 48 lb.	= 1 bu.
Safflower, 37-48 lb.	= 1 bu.
Mustard seed 58-60 lb.	= 1 bu.

See paragraph 393 for finding the number of bushels of grain in a rectangular or a round bin.

398. Conversion factors for hay crops

Hay crops:

3 tons (green weight) ..... = 1 ton (dry weight).

If a respondent can report only the number of bales, find out the approximate weight per bale, in pounds. Match this weight with the corresponding number of bales estimated to equal 1 ton, as given in the following table. Divide the total number of bales by the number per ton; enter the result to the nearest whole ton. For example, a farmer reports 830 bales of hay, averaging 40 pounds per bale. The table shows that it takes 50 40-pound bales to equal one ton. 830 divided by 50 equals 16-3/5 tons. You would round this result and enter 17 tons on the questionnaire.

Approximate weight per bale of hay (pounds)	*Number of bales per ton*
20	100
25	80
30	67
35	57
40	50
45	44
50	40
55	36
60	33
65	31
70	29
75	27
80	25
85	24
90	22
95	21
100	20
105	19
110	18
115	17

399. Conversion factors for field seeds

	Pounds per bushel
Alfalfa seed	60
Austrian winter peas	60
Bluegrass or June grass seed (green-weight basis)	14 to 30
Clover seed	60
Millet seed (other than proso)	50
Orchardgrass seed	14
Sunflower seed	32
Timothy seed	45
Vetch seed	60

400. Conversion factors for Irish potatoes, and sweetpotatoes

Irish potatoes:

1 bu	= 60 lb.
1 cwt.	= 100 lb.
1 ton	= 20 cwt.
1 bbl	= 165 lb. or 2¾ bu.
100-lb. bag (cwt.)	= 1⅔ bu.

Sweetpotatoes:

1 bu.	=	55 lb.
1 crate	=	50 lb.

401. Conversion factors for cotton

Cotton:

1 bale (500 lb. lint)	=	Seed cotton, 1,500 lb.

402. Conversion factors for dry field and seed beans, popcorn, broomcorn, sugarcane for sirup, and hops

Dry field and seed beans:	*Pounds per bushel*
Lima, dry	56
Others, dry	60

Popcorn:

1 bu. ear corn	=	70 lb.
1 bu. shelled corn	=	56 lb.

If respondent reports in pounds of shelled popcorn, multiply pounds of shelled corn by 1.25 to get pounds of ear corn. For example, 56 lb. x 1.25 = 70 lb.

Broomcorn:

1 bale of broomcorn brush	=	333 lb.
6 bales	=	1 ton of broomcorn brush

Sugarcane for sirup:

1 gal.	=	11.45 lb.

Hops:

1 bale	=	200 lb.

403. Conversion factors for cranberries and other berries

Cranberries:

1 barrel	=	100 lb.
¼ barrel box	=	25 lb.

Other berries:

1 pt.	=	¾ lb.
1 qt.	=	1½ lb.
1 gal.	=	4 qt.
2 pints	=	1 qt.
1 24-qt. crate	=	36 lb. stemmed strawberries, blackberries, or raspberries.
1 16-qt. tray or crate	=	24 lb.

404. Conversion factors for acres in orchards, etc.

When necessary to estimate the acres in fruit and nut trees, first find out the planting distance between trees, then divide the total number of trees by the number per acre that corresponds with that planting distance, as given in the following table. The result represents the approximate acreage. For example, if the planting distance is 25′ x 25′, there are 70 trees per acre and 700 trees would represent 10 acres.

Number of fruit and nut trees per acre

Planting distance (feet)	Number per acre	Planting distance (feet)	Number per acre
8 x 8	680	22 x 24	82
8 x 10	545	24 x 24	75
8 x 12	454	25 x 25	70
9 x 9	538	26 x 26	64
10 x 10	436	27 x 27	60
10 x 12	363	28 x 28	56
12 x 12	302	28 x 30	52
12 x 14	259	30 x 30	48
14 x 14	222	32 x 32	43
15 x 15	194	35 x 35	35
16 x 16	170	36 x 36	34
18 x 18	134	40 x 40	27
18 x 20	121	40 x 45	24
18 x 22	110	45 x 45	22
20 x 20	109	45 x 50	19
20 x 22	99	50 x 50	17
20 x 24	91	55 x 50	16
22 x 22	90	60 x 60	12

405. Conversion factors for apples

Apples: The term "bushel" as used for apples means something different in different States and areas. The actual container referred to may be a box, carton, or basket of several sizes. In many cases, however, the cubic inch content may be the same. The main reasons for differences in weight between States or areas are (1) differences in varieties, (2) differences in size of fruit, (3) differences in the type and amount of packing material used, (4) actual differences in volume of the container, and (5) differences in how full container is filled. Try to get the grower to estimate the weight of his own unit when conversion to weight is necessary. If he feels he cannot, use the following weights for a "bushel" of apples:

California	37
Montana	39
Maine, New Hampshire, Vermont, Massachusetts, Nevada	40
Oregon, New York, Idaho	41
Rhode Island, Wisconsin, Minnesota, Connecticut	42
Iowa, Kansas, West Virginia, Colorado, Arkansas, New Mexico, Washington, Louisiana, North Dakota, South Dakota, Nebraska, Texas, Wyoming, Arizona, Oklahoma	43
Pennsylvania, Ohio, Indiana, Michigan, Missouri, Virginia, Tennessee, Utah, Delaware, Florida, Mississippi, Georgia, Alabama, Maryland, South Carolina	44
New Jersey, Illinois, North Carolina	45
Kentucky	47

Other conversion factors as follows:

34 lb.	= 1	loose box (Washington and Oregon)
3 bu.	= 1	bbl.
1 lb. of dried apples	= 8	lb. of fresh fruit

406. Conversion factors for peaches and pears

Peaches:

1 bu.	= 48 lb.
¾ bu. basket	= 36 lb.
½ bu. basket or box	= 24 lb.
1 Western lug box	= 20 lb.
1 California fruit box	= 18 lb.
1 ton	= 2,000 lb.
1 lb. dried peaches	= 7½ lb. fresh fruit for clings or 6½ lb. fresh fruit for freestones.

Pears:

1 bu.	= 50 lb.
40 bu.	= 1 ton.
1 box	= 50 lb.
1 crate, Western (4½″ × 16″ × 16½″)	= 22 lb.
1 lb. dried pears	= 5½ lb. fresh fruit.

407. Conversion factors for grapes

Grapes:

1 bu.	= 48 lb.
1 Eastern 4 qt. climax basket	= 6 lb.
1 Eastern 12 qt. basket	= 18 lb.
1 Western lug	= 28 lb.
1 Western 4-basket crate	= 20 lb.
1 box, sawdust pack	= 34 lb.
1 ton	= 41.67 bu.
1 lb. raisins	= 4 lb. grapes.

408. Conversion factors for plums and prunes

Plums and prunes:

1 bu.	= 56 lb.
½ bu. basket	= 28 lb.
California, 4-basket crate	= 20-29 lb.
1 box, Northwestern suitcase	= 16 lb.
1 lb. dried fruit	= 2½ lb. fresh fruit for California and 3½ lb. for Washington and Oregon.

409. Conversion factors for cherries

Cherries:

1 bu. unstemmed	=	56 lb.
1 qt. unstemmed	=	1¾ lb.
1 bu. stemmed	=	64 lb.
1 qt. stemmed	=	2 lb.
1 cherry lug (4⅛" × 11½" × 14")	=	16 lb.
4 qt. climax basket	=	6 lb.

410. Conversion factors for apricots

Apricots:

1 bu.	=	48 lb.
1 lug (Brentwood) (½ bu.)	=	24 lb.
1 Western 4-basket crate	=	24 lb.
5½ lb. fresh fruit	=	1 lb. dried fruit.

411. Conversion factors for figs, avocados, nectarines, and olives

Figs:

1 California single layer crate	=	6 lb.
1 California deep crate	=	15 lb.
1 lb. dried fruit	=	3 lb. fresh fruit for California and 4 lb. fresh fruit for other areas.

Avocados:

1 single layer flat	=	13 lb. for California and 12 to 15 lb. for Florida.
1 bu.	=	50 lb.
1 lug	=	12-15 lb.

Nectarines:

1 bu.	=	50 lb.
California fruit box (2 layer)	=	18 lb.
California fruit box (1 layer)	=	11 to 13 lb.
Sanger lug	=	22 to 24 lb.
L. A. lug	=	30 lb.
4-basket crate	=	30 lb.

Olives:

1 lug box	=	25-30 lb.

412. Conversion factors for citrus fruits

Some citrus conversion factors vary from year to year and from area to area. Be sure to check with the respondent to see if the particular one you use seems correct to him. Use his own conversion factor, if he knows; if he does not, use the conversion factor given below.

Unit of measure and kind of fruit	California and Arizona	Texas	Florida	Louisiana	Alabama and Mississippi
Field box:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Valencias	55	90	90	—	—
Satsumas	—	—	90	—	—
Temple	—	—	90	—	—
Tangerines	—	100	90	—	—
Navel	52	—	—	—	—
Other oranges	52	90	90	90	—
Grapefruit	—	80	80	—	—
Desert Valleys	50	—	—	—	—
Other California areas	52	—	—	—	—
Lemons	52	90	90	—	—
Tangelos	—	—	90	—	—
Packed box (a half-box, usually a paper carton, equals one-half weight of a packed box):					
Satsumas	—	—	90	85	[1]85
Tangerines	—	—	[2]90	90	[1]90
Other oranges	75	90	90	90	90
Grapefruit	—	80	80	80	80
California desert valleys and Arizona	64	—	—	—	—
Other California areas	67	—	—	—	—
Lemons	76	—	—	—	—
Limes	—	—	80	—	—
Tangelos	—	—	90	—	—
Bushel:					
Satsumas	—	—	—	[1]53	53
Tangerines	—	—	—	53	53
Other oranges	—	—	—	56	56
Grapefruit	—	—	—	50	50
Limes	—	—	55	—	—
Mesh bags (½ box):					
Oranges	—	45	45	—	—
Grapefruit	—	40	40	—	—

[1] A half-strap equal 40 to 42 lb. or 4/5 bu. [2] A half-box equals 45 lb.

413. Conversion factors for mangoes, quinces, guavas, Japanese persimmons, and pineapples

Mangoes:

1 bu.	= 55 lb.
Florida avocado box	= 16 lb.

Quinces:

1 bu.	= 48 lb.

Guavas:

1 bu.	= 54 lb.

Japanese persimmons:

1 fruit box (1 layer)	= 11-13 lb.
1 fruit box (2 layers)	= 18 lb.

Pineapples:

1 crate	= 70 lb.

414. Conversion factors for land area

Land area:

144 square inches	= 1 square foot
9 square feet	= 1 square yard
30 ¼ square yards	= 1 square rod
160 square rods	= 1 acre
640 acres	= 1 square mile (or section)
1 acre	= 160 square rods; 4,840 square yards; 43,560 square feet

415. Conversion factors for lumber

Lumber:

1 board foot (1″ × 12″ × 12″; 2″ × 6″ × 12″; 2″ × 4″ × 18″; 4″ × 4″ × 9″; etc.)	= 144 cu. inches

416. Conversion factors for maple sap, maple sirup

Maple products:

40 gallons of sap	= 1 gallon of sirup
11 lb. maple sirup	= 1 gallon of sirup
8 lb. maple sugar	= 1 gallon of sirup

417. Conversion factors for cream

To convert cream to butterfat—

Multiply ..... { pints by 3
quarts by 6
gallons by 2.5

418. Conversion factors for fractions

Report fractions, when required, to the nearest tenth according to the following table.

If respondent reports fraction									Enter nearest tenth on A1 as—
1/7 to 1/19	2/13 to 2/39								1/10
1/4 to 1/6	2/8 to 2/12	3/12 to 3/20	4/16 to 4/26	5/20 to 5/33					2/10
1/3	2/6 to 2/7	3/9 to 3/11	4/12 to 4/15	5/15 to 5/19	6/18 to 6/23				3/10
	2/5	3/7 to 3/8	4/9 to 4/11	5/12 to 5/14	6/14 to 6/17	7/16 to 7/20	8/18 to 8/22	9/20 to 9/25	4/10
1/2	2/4	3/6	4/8	5/10 to 5/11	6/11 to 6/13	7/13 to 7/15	8/15 to 8/17	9/17 to 9/19	5/10
		3/5	4/7	5/8 to 5/9	6/10	7/11 to 7/12	8/13 to 8/14	9/14 to 9/16	6/10
	2/3		4/6	5/7	6/9	7/10	8/11 to 8/12	9/13	7/10
		3/4	4/5	5/6	6/8	7/9	8/10	9/11 to 9/12	8/10
					6/7	7/8	8/9	9/10	9/10