

# How Much Manure Will My Animals Produce?

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## Why do I need to know how much manure is produced?

Living on a small farm, rural acreage, or a larger lot with animal rights can be very rewarding. In addition to getting to enjoy more of nature, you have the ability to produce some of your own food. You may have a few chickens or a couple of horses, but if you have livestock you will have to deal with the manure that is produced.

If managed correctly, manure can be a valuable resource providing nutrients for your garden or pasture; but, if not managed correctly, manure can degrade the environment, produce odors and flies, and be a source of irritation with the neighbors. Poor manure management can also result in unhealthy livestock, and human health issues. Even a few animals can damage the environment and create problems with the neighbors.

One of the first steps in managing manure correctly is knowing how much manure is produced by your animals. From there, you can determine the best way to handle the manure until it can be properly applied to your property or hauled away.

## Determining the Quantity of Manure Produced by your Animals

Manure production varies tremendously by the animal species, the diet fed, and the amount of bedding used. To determine the total amount of manure produced, manure

production tables provide some good starting points. Table 1 provides average daily manure production values per animal per day. If your livestock spend part of the year in a pasture and part in a stable or corral, you will need to adjust the production values accordingly. While stabled or corralled, there will be manure and bedding that will need to be handled. Manure that is deposited directly on the pasture is not maintenance free. Manure deposited in a pasture may need to be broken up and spread out, and one needs to make sure that the manure is not ending up in a waterway.

To determine the total amount of manure that you will need to handle, it is helpful to break it into steps, especially if you have a few different kinds of livestock.



Figure 1. Manure pile

Photo source: [www.usda.gov](http://www.usda.gov)

**Location** - Identify all of the locations that your livestock reside or are housed. Livestock may be kept in coops, pens, or stables.

**Table 1. MANURE PRODUCTION ESTIMATES<sup>†</sup> (as excreted)<sup>‡</sup>**

Animal	Size/lb	MANURE PRODUCTION (lb/day)	MANURE PRODUCTION (ft <sup>3</sup> /day)	Water, %	N (lbs)	P <sub>2</sub> O <sub>5</sub> (lbs)	K <sub>2</sub> O (lbs)
<b>Dairy</b>							
Calf	150	12.00	0.185	88	0.06	0.01	0.05
Heifer	750	45.00	0.700	88	0.23	0.08	0.23
Lactating Cow	1,000	111.00	1.790	88	0.72	0.37	0.4
Lactating Cow	1,400	155.00	2.500	88	1.01	0.52	0.57
<b>Beef</b>							
Calf (confinement)	450	48.00	0.760	92	0.2	0.09	0.16
Calf (confinement)	650	69.00	1.090	92	0.29	0.13	0.23
Finishing	750	37.00	0.590	92	0.27	0.08	0.17
Finishing	1,100	54.00	0.860	92	0.4	0.12	0.25
Cow (confinement)	1,000	92.00	1.460	88	0.35	0.18	0.29
<b>Swine</b>							
Nursery	40	3.00	0.050	89	0.03	0.01	0.02
Finishing	150	7.40	0.120	89	0.09	0.03	0.04
Finishing	300	14.80	0.240	89	0.17	0.06	0.09
Gestating	300	6.80	0.110	91	0.05	0.03	0.04
Gestating	500	11.40	0.180	91	0.08	0.05	0.06
Lactating	375	17.50	0.280	90	0.17	0.11	0.13
Lactating	600	28.10	0.450	90	0.27	0.18	0.21
Boar	300	6.20	0.010	91	0.04	0.03	0.03
Boar	500	10.30	0.170	91	0.07	0.06	0.06
<b>Horse</b>							
Adult (sedentary)	1,000	54.50	0.880	86	0.18	0.06	0.06
<b>Small Ruminants</b>							
Sheep/Feeder Lamb	100	4.10	0.060	75	0.04	0.02	0.04
Goats <sup>†</sup>	80	4.20	0.066	70	0.02232	0.002556	0.016488
Goats <sup>†</sup>	160	8.40	0.132	70	0.04464	0.005112	0.032976
<b>Poultry</b>							
Broiler	4	0.38	0.006	74	0.0042	0.0028	0.002
Layers	4	0.20	0.003	75	0.003466	0.001066	0.0016
Duck	4	0.44	0.007	73	0.0043	0.0034	0.0026
Turkey (female)	10	0.47	0.007	75	0.0078	0.0051	0.0034
Turkey (male)	20	0.74	0.012	75	0.0111	0.0074	0.0048
<b>Rabbits<sup>†</sup></b>							
		0.34					
Rabbit (small)	3	0.46	0.009	69	0.034768	0.006899	0.008968
Rabbit (meat)	11	1.65	0.032	69	0.127482	0.025297	0.032881

<sup>†</sup> - Adapted from Midwest Plan Service-18, 2nd Edition

<sup>‡</sup> - Bedding, waste water, etc. will increase total volume of waste

<sup>†</sup> - Adapted from Ogejo et al., DOI:10.13031/2013.35912; Living on the Land

<sup>†</sup> - Adapted from LPES Small Farms; Exotic Animal Care; Dinuccio et al., DOI:10.1016/j.agee.2018.09.018; DeJie. J. Ecol. 2011. 27(1):44-48

Determining the amount of manure produced in each location will aid you as you develop a plan for handling your manure. Some larger animals may be put on pasture in the summer months and kept inside during the winter. Manure produced while the livestock are on pasture is not calculated in the volume of manure that you need to handle. The nutrient value of the manure deposited on the pasture should be considered when you apply fertilizer to the pasture.

**Number of Animals, Length of Time** - Identify the number of animals, and the length of time, that the animals are housed at each location. If you have growing animals that are only around for a portion of the year, it may be helpful to calculate the animal numbers and their size for each month. Then add the numbers for each month together to get a yearly total.

**Manure** - For each animal, or group of animals, identify the number of days that manure is produced in that particular location. Using Table 1, determine the total amount of manure produced. Please note that Table 1 only provides values for the actual manure produced.

**Bedding** - For each animal, or group of animals, identify the amount of bedding used when in a particular location. Bedding and wasted feed increases the amount of manure one needs to handle. In many cases, bedding and wasted feed doubles the volume (ft<sup>3</sup>) of manure that one needs to handle. Table 2 provides some basic values for common bedding materials. The weight of bedding is added to the total weight of material to be handled (Equation 1).

**Table 2. RECOMMENDED BEDDING REQUIREMENTS<sup>†</sup>**  
(lbs bedding/day/animal)

Animal Type	Animal Weight	Density	Long Straw 2.5 (lbs/ft <sup>3</sup> )	Chopped Straw 7 (lbs/ft <sup>3</sup> )	Sawdust 12 (lbs/ft <sup>3</sup> )
<b>Dairy</b>					
Adult	1000		9.3 lbs/day	11 lbs/day	9 lbs/day
Calf	150		1.4 lbs/day	1.65 lbs/day	1.80 lbs/day
<b>Swine</b>					
Adult	500		1.75 lbs/day	2 lbs/day	..
finishing	250		0.875	1 lb/day	..
<b>Poultry</b>					
Layer	4		..	..	0.0064 lbs/day
<b>Horse<sup>‡</sup></b>	1000		12 lbs/day	15/ lbs/day	8 lbs/day
31 lb feces, 2.4 gallons urine = 50 lbs waste/day					

<sup>†</sup> - Adapted from Midwest Plan Service-18, 2nd Edition

<sup>‡</sup> - Horse Manure Management: Bedding Use, Rutgers University

The volume of bedding made from living materials such as straw and wood shavings typically reduces by 50% when mixed with manure, so only half of the bedding volume is

added to the volume of waste produced (Equation 2). Bedding made from non-living materials such as sand do not reduce in volume. If using sand, you would add the

volume of the bedding to the volume of the manure with no reduction percentage.  
Wasted feed is not included in these numbers,

but will increase the total amount of manure that you need to handle.

**Equation 1: Weight of Manure + Bedding**

Total weight of manure with bedding = weight of manure + weight of bedding

**Equation 2: Volume of Manure + Bedding** (from living materials only, e.g., straw, sawdust)

Total volume of manure + bedding = volume of manure + (volume of bedding x 0.5)

### Example Calculation

You have 2 horses (1,000 lbs) that are kept in a corral/shed year-round. On average, each horse is given 10 lbs of straw (long) bedding per day. How much manure and bedding will be need to be handled?

#### Manure Only

Weight: 54.50 lbs manure/day/horse x 365 days/yr x 2 horses  
= **39,785 lbs manure** or 19.89 tons of manure per year

Volume: 0.880 ft<sup>3</sup>/day/horse x 365 days/yr x 2 horses = **642.4 ft<sup>3</sup> manure** per year

#### Bedding

Weight: 10 lbs bedding/horse/day x 365 days/yr x 2 horses  
= **7,300 lbs bedding** or 5.475 tons of bedding per year

Volume: To determine how many cubic feet of straw are added per day, divide the weight of the straw by the density.  $\frac{10 \text{ lbs straw/day}}{2.5 \text{ lbs/ft}^3} = 4 \text{ ft}^3$

Therefore, 10 lbs straw has a volume of 4 ft<sup>3</sup>

When the bedding is mixed with manure, the volume is reduced by 50% (Equation 2).

= 4 ft<sup>3</sup> bedding/day/horse x 365 days/yr x 2 horses x .5 (50%)  
= 4 x 365 x 2 x 0.5  
= **1,460 ft<sup>3</sup> of bedding** per year

#### Total Manure & Bedding to be Handled each year:

Weight: 39,785 lbs manure + 7,300 lbs bedding = 47,085 lbs/year = **23.54 tons/year**

Volume: 642.4 ft<sup>3</sup> manure + 1,460 ft<sup>3</sup> bedding = **2,102.4 ft<sup>3</sup>/year**