

Swine: Planning Swine Facilities¹

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Considerations in Establishing Swine Units

When planning facilities for swine, many facets of the industry must be taken into consideration, such as:

1. Location of the facilities in regard to zoning in a particular county.
2. Sufficient land to provide for future expansion.
3. Waste disposal—consider use; such as a lagoon, separation of solids from liquids, transferring to pasture or crops via pumping or mechanically injecting into the soil.
4. Drainage and soil type in relation to development of lagoon systems for animal wastes.
5. Prevailing winds in relation to housing by the owner as well as potential neighbors.
6. Decision on type of swine enterprise to be initiated, feeder pig production, farrow to finish, or feeder to finish unit.
7. Feed source economics of supplying the unit with feed ingredients required to be able to compete with other areas of the country
8. Market outlets available in an area; such as livestock markets, packing houses and outlets for breeding stock.
9. Capital requirements—sufficient capital should be available to finance the operation for at least two years, and preferably three years, to allow adequate market flow.
10. Availability of information in the area that producers can draw on—county agents, experiment stations, and related swine production resources in the area.
11. Availability of qualified veterinary services.

Swine Production Guide

Swine Table 1, showing the swine production guide, gives guidelines for varying size units, background with needed requirements of space, equipment needs, water and storage. Careful study of this table along with the following tables 2–16 furnishes the needed information for modern swine production.

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Table 1. Swine production guide.

Number of Farrowing Stalls (pens)												
	10	10	10*	20	20	20	30	30	30	40	40	40
Number of Sows												
	10	20	50	40	80	100	60	120	150	80	160	200
Number of Groups of Sows												
	1	2	5	2	4	5	2	4	5	2	4	5
Number of Farrowing Periods												
	2	4	12	4	8**	12	4	8**	12	4	8**	12
Number of Pigs Farrowed per Year When Litter Size Is												
8-	160	320	960	640	1280	1920	960	1920	2880	1280	2560	3840
9-	180	360	1080	720	1440	2160	1080	2160	3240	1440	2880	4320
10-	200	400	1200	800	1600	2400	1200	2400	3600	1600	3200	2200
Nursery Space Required Sq. Ft.***												
	+	+	550	+	500	1100	+	750	1650	+	1000	2200
Max. Number of Pigs in Finishing at One Time												
	80	80	360	160	320	720	240	480	1080	320	640	1440
Max. Finishing Area (8 Sq. Ft./Hog)+												
	640	640	2880	1280	2560	5760	1920	3840	8640	2560	5120	115
Number of Feeder Spaces++												
Nursery	--	--	27	--	110	120	--	160	180	—	220	240
Finishing	27	27	120	55	110	240	80	160	360	110	22	480
Waterers Needed												
	--	--	9	--	20	18	--	30	27	20	40	36
	5	5	18	10	20	36	15	30	54	20	40	72
Avg. Gal. Water Needed per Day (Sows Included)												
	150	300	900	600	1200	1800	900	1800	2700	1200	2400	3600
Avg. Gal. Manure Storage Per Month (Increased 50% for Water Wastage)												
	4K	8K	24K	16K	32K	48K	24K	48K	72K	32K	64K	96K
* When considering large units, 100–500, multiples of the 10 stall units could be used as a guideline.												
** When 8 farrowings per year is followed, then 5 to 6 week weaning may be practiced with a 4 to 5 week stay in the nursery.												
*** Based on pen space of 2.5 to 3.0 sq. ft./animal.												
+ In 2 and 4 farrowings per year, pigs can be left in the farrowing house from weaning until they weigh approximately 50–75 lbs. No nursery will be needed. Completely slotted farrowing pen floors work best in this system.												
++ See the section “Estimated Amounts of Feed Required Per Hog by Periods.”												

Table 2. Feeders and waterers per pig.

	Weaning to 75 lb.	75–125 lb.	125 lb. to Market
Number of Pigs per Automatic Waterer	10	10–15	10–15
Number of Pigs per Self-Feeder Hole (or per linear foot)			
Confinement	4	3	3
Pasture	4–5	3–4	3–4

Table 3. Average feed consumption per day.

Sow Size	Method	Amount Daily*	Daily Gain
During Gestation	Limit feed		
	(Pasture)	3 lb.	—
	(Confinement)	4 lb.	—
Lactation	Full Feed	12 lb.	—
Growing Hogs			
10 lb.	Full Feed	.5 lb.	.3 lb.
30 lb.	Full Feed	1.9 lb.	1.0 lb.
75 lb.	Full Feed	4.6 lb.	1.6 lb.
150 lb.	Full Feed	7.0 lb.	2.0 lb.
250 lb.	Full Feed	10.0 lb.	2.2 lb.

* Properly balanced diet that meets animal's daily nutrient requirements.

Table 4. Average water consumption.

Weight of Hog	Lb. of Water Daily*	Gallons
12	4.0	0.5
50	8.0	1.0
100	8–12	1.0–1.5
150	12–17	1.5–2.0
200	17–21	2.0–2.5
250	21–25	2.5–3.0
Sow during gestation	25.0	3.0-4.0
Sow during lactation	50.0	4–7

* When water is used for cleaning and mist coolers, double water requirements given in table.

Note: As a rule of thumb, water consumption by swine will be about twice the feed intake. They will tend to drink somewhat more in hot weather. Lactating sows will have a water intake of about three times their feed intake.

Table 5. Slatted floor material.

Material	Expected Life*	Advantages	Disadvantages
Aluminum	8–10	Easy installation and long life	Temperature-cold
Concrete	10	Long life	Temperature-cold
Expanded metal	3	Dry, easily cleaned	Short life
Expanded metal (plastic coated)	3–8	Comfortable, easily cleaned	Questionable life span
Plastic fiberglass	4–6	Easily installed	Questionable life span
Steel	3–5	Easily installed and cleaned	Temperature-cold
Stainless steel	10	Easily installed and cleaned	Temperature-cold
Wood	3	Lowest installation cost	Short life

* Quality of material installed determines life expectancy.

Table 6. Slatted floor spacing.

Type	Width	Space
Farrowing	3"–5"	3/8"
Early weaning**	2"–4"	3/4"
Nursery	4"–5"	1"
Growing	4"–5"	1"
Finishing	4"–8"	1"

* Widen spacing to 1 1/4 inch at rear of sow and cover with grate while farrowing.

** Early weaning at 2 weeks or older.

Table 7. Square feet per animal.

Weight of Pig	Slatted		Solid Floor	
	Winter	Summer	Winter	Summer
10–25	2	2	3	3
25–40	3	3	4	4
40–100	4	4	5	5
100–150	6	6	7	8
150–200	7	8	8	10
200	8	10	10	12
Sow	15	17	15	17

Table 8. Pigs per pen.

Size of Pig	Optimum	Maximum
Weaning to 75 lb.	16	30–30
75 lb. to market	5–15	25–50

Table 9. Ventilation rates, cfm.

Life stage	Unit	Cold Weather	Mild Weather	Hot* Weather
		cfm/hd (or sow + litter)		
Prenursery pig	12–30 lb.	2	10	25
Nursery pig	30–75 lb.	3	15	35
Growing pig	75–150 lb.	7	24	75
Finishing pig	150–220 lb.	10	35	120
Gestating sow	325 lb.	12	40	150
Boar/Breeding sow	400 lb.	14	50	300

* These rates may be reduced when supplemental cooling is available in hot weather; and may be increased when air velocities on pigs are low in summer.

** 500 cfm is the generally recommended hot weather rate in farrowing, however local recommendations range from 250 cfm in northern areas of the United States to 1000 cfm or more in the southeast and southwest.

The rate for each season is the total capacity needed. For sow and litter: 20 cfm/unit (cold weather) + 60 cfm/unit = 80 cfm unit (mild); add 420 cfm/unit for 500 cfm/unit total hot weather rate.

Cold weather rate: In some cases, this airflow needs to be adjustable, due to a change in the number of animals in the room or due to their growth. Ideally, at least one fan should operate at all times when the inside temperature is above 35°F. Set a thermostat to shut the fan off when the inside temperature drops below 35°F and activate an alarm to notify the operator. This fan should supply the cfm rate listed in Table 9 under “Cold weather”. The should exhaust the air from above any stored liquid manure

Mild weather rate: Provide additional airflow, thermostatically set to start in 3-5 degree steps, from lowest desired temperature to prevent sudden drops in temperature. These fans, together with the cold weather fans, provide the capacity for outdoor temperatures up to about 55°F.

Hot weather rate: Provide additional fans to supply the cfm rates listed under “Hot weather”. Some or all of these fans should be operated when the inside building temperature is above 75°F. Hot weather rate airflow capacity of sows and litters and breeding animals can be reduced somewhat by utilizing drip cooling or zone cooling (water evaporation or mechanical air conditioning) of sows and boars.

Most growing-finishing facilities in the southeastern US are curtain-sided buildings that utilize natural ventilation. The curtains can be opened or closed depending upon temperature. This type of ventilation works well if the building is not too wide.

Table 10. Liquid manure capacity conversion guides.

Cu. Ft.	= Length x width x depth
1 Cu. Ft.	= 7.5 gal.
1 gal.	= 8.35 lbs.
1 Cu. Ft.	= 62.5 lbs.
1 Ton	= 32 Cu. Ft.
1 Cu. Yd.	= 27 Cu. Ft.
Storage Capacity Needed	
No. animals x daily manure production x days storage time desired + extra water.	

Table 11. Approximate daily manure production.

Weight of Hog	Cu.Ft./Day–Solid & Liquid	Gallons/Day
50 lbs.	1/15	.5
100 lbs.	1/8	1.0
150 lbs.	1/5	1.7
200 lbs.	1/4	2.0
250 lbs.	1/3	2.6
Bred Sows	1/8	1.0
Lactating Sows	1/2	3.5

Table 12. Manure disposal systems.

Type	Requirements
Storage Tank	1–2 gal. per day per head. Plan for 2–6 month storage capacity. Manure is removed and spread on crop land. Commercial pumps and spreaders available.
Lagoon System	50–100 square feet of surface per pig. Water volume required: 2 cubic feet X number of animals X max. animal weight.

Table 13. Manure tank storage needs.

Size of Hog	1 Month	3 Months	6 Months
50 lbs.	16 gal.	48 gal.	96 gal.
100 lbs.	30 gal.	90 gal.	180 gal.
200 lbs.	60 gal.	180	360 gal.
Gestating Sow	30 gal.	90 gal.	180 gal.
Lactating Sow	105 gal.	315 gal.	630 gal.

Table 14. Tank storage size (capacity of tank 5 feet deep).

Inside Tank Width	When Tank Length is			
	10 Feet	20 Feet	30 Feet	40 Feet
4 feet	1,500 gal.	3,000	4,500	6,000
6 feet	2,250	4,500	6,750	9,000
8 feet	3,000	6,000	9,000	12,000

Table 15. Approximate dry matter and fertilizer nutrient composition of swine manure at time applied to the land.¹

Manure Handling System	Dry Matter	Ammonium N ²	P ₂ O ₅ ³	K ₂ O ⁴	Total N ⁵
Solid	lb./ton				
Without bedding	18(15–20)	7(6–9)	9(7–13)	8(6–10)	10(9–11)
With bedding	18(17–20)	6(5–8)	7(5–10)	7(6–9)	8(7–10)
Liquid	lb./1,000 gal				
Anaerobic storage	4(2–7)	26(21–31)	27(13–30)	22(12–30)	36(28–55)
Lagoon ⁶	1(.3–2)	4(2–5)	2(1–4)	4(2–6)	4(3–6)

¹Application conversion factors: 1 bu. = 40–60 lb. solid manure; 1,000 gal. = about 4 tons.

²Ammonium N, which is available to the plant during the growing season.

³To convert to elemental P, multiply by 0.44.

⁴To convert to elemental K, multiply by 0.83.

⁵Ammonium-N plus organic N, which is slow releasing.

⁶Includes feedlot runoff water and is sized as follows: single cell - 2 cu. ft./lb. animal weight; two-cell lagoon-cell 1, 1-2 cu. ft./lb. animal wt. and cell 2, 1 cu. ft./lb. animal weight.

Table 16. Concrete conversion guide.

Cu. Yd.	= 81 Sq. ft. 4" floor
	= 54 Sq. ft. 6" floor
* Recommended minimum 3,000 psi and maximum 4,000 psi concrete and use medium aggregates. Flush systems: Two different types of flush systems are presently being used, dump and syphon, in confinement housing. They do an excellent job when constructed properly. Contact UF/IFAS Extension agriculture engineer for assistance before construction begins, to be assured of a working system.	