

Pig Case Study USA 1

Free-range pig production system, Willis Farm, Thornton, Iowa

Authors: Cat Carroll and Marlene Halverson
See also Pig Case Study USA 2

After college, Paul Willis spent time working with the Ministry of Agriculture in Nigeria. In 1970, he returned home to Thornton, Iowa, to help out on the family farm and, together with his wife Phyllis, decided to raise pigs. Shunning advice from university experts, they decided to raise pigs outdoors. For the purpose, Paul selected a mixed breed of pigs known as Farmers' Hybrid. This is a combination of older breeds having good mothering skills, higher backfat than conventional pigs and a sturdy conformation for outdoor living.

In 1994 Paul was introduced to Bill Niman, a co-owner of a company processing and distributing fine meats to up-market restaurants and natural food retailers. After sampling pork from the pigs on Paul's farm, Bill decided it was the best pork he had ever tasted. So began a lasting co-operative relationship with Niman Ranch Inc of California.

At a conference in 1997, Paul and Phyllis met Diane Halverson of the U.S. non-profit Animal Welfare Institute (AWI). In 1989, AWI had obtained the first U.S. Department of Agriculture-approved label for pork products from family farms raising pigs on pastures or in bedded pens, without the use of sub-therapeutic antibiotics. AWI had developed its husbandry protocol with the input of veterinarians, scientific experts in animal welfare and farmers. The key underpinnings of the AWI protocol are the *Five Freedoms* first stipulated



The Niman Ranch Pork Company headquarters is the red brick house on the boyhood farm of Paul Willis

by the Brambell Committee and later expanded by the Farm Animal Welfare Council and the Carpenter Committee. For all pigs special emphasis is placed on:

- Good health
- Attentive and skilled husbandry
- Freedom of movement
- Opportunity to form stable groups and socialize freely with others in their group
- Enriched environments for foraging, fibre, and nutrition
- Access to fresh water at all times

The Willis farm was endorsed by AWI and serves as a model for the other farms that have joined the Niman Ranch program. Paul now manages the Niman Ranch Pork Company (NRPC), which is half owned by the farmer members that number nearly 500. Besides buying pigs for the program, NRPC provides field staff that advise farmers and work closely with AWI to help farmers maintain the husbandry standards, with which the farmers are required to comply. NRPC is half-owned by nearly 500 farmer members and half-owned by Niman Ranch, Inc.



Paul and the other farmers in the Niman Ranch programme use sturdy breeds capable of thriving in a variety of outdoor environments

NRPC sells pork carcasses to Niman Ranch, Inc (NRI) of California. The company has 3 slaughter plants to reduce live transport and the carcasses are taken to California. The plants have been upgraded, are inspected by US Department of Agriculture and can guarantee traceability. NRI processes the carcasses and markets fresh and specially-processed pork exclusively from these farms to natural foods retailers and up-market restaurants across the United States. Farmers selling their pigs this way are able to command a higher price in the market, making it possible for them to improve the welfare of the pigs. The higher prices also encourage new farmers to join the program. There is also a guaranteed floor price above cost of production.

Signing on with Niman Ranch and getting AWI approval have permitted Paul to make a living from humane husbandry practices in a way that once seemed impossible alongside 'factory' systems. Paul now owns the remaining Farmers' Hybrid stock that includes mixtures of Duroc, Chester White and Berkshire, all valued for high meat quality and capable of thriving in outdoor environments. The backfat thickness of the pigs measures about 1 inch. The program strives for sows who milk well, are not easily excited, are gentle with piglets, careful with their movements and have a good sense of where their piglets are.

Today, Paul and Phyllis raise 2,500 pigs on their 320-hectare farm. Paul keeps 200 to 300 sows at a time on his farm, usually producing about two litters per sow annually. Pigs live outdoors with access to shelters, fresh water and feed, pastures, and wallows in the summer. In winter, when temperatures can dip to -20° F (-30°C) and lower, often with a stiff wind chill, pigs are housed on deep straw and maize stalk (corn stover) beds in hoop buildings and other converted barns on the farm. Hoop buildings are 10-20m wide and up to 30m long with wooden sides and a polyethylene roof covering a concrete floor. Pigs still have access to the outdoors for sunshine and fresh air.

In a nation where people who raise pigs almost universally call themselves 'pork producers,' Paul calls himself a pig farmer. The fondness he has for his pigs is reflected in their comfort with him and his two hired workers, as well as in their uninhibited curiosity towards visitors to the farm. Paul points out that pigs are social animals. Consequently, he keeps his pigs in stable social groups.



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Kind treatment by stockpeople means that pigs react calmly to visitors

Recognizing the importance of nest building to farrowing sows, Paul is particularly concerned that his sows have the materials and ability to nest freely when it comes time to bear their young. In summer, sows farrow in individual huts on pastures that are lush with grass the sows can cut and use to bed their huts. To maintain the pasture, the sows have a nose ring placed through their septum. This is permitted by AWI to guarantee access to pasture in season. Rings placed in the rim of the nose disc were banned in 2004.

Paul has experimented with not using nose rings, but finds that the pastures become too degraded and barren, something he wishes to avoid because he feels pigs need a high level of environmental enrichment. Initial insertion of the ring is painful, even when done properly. Paul notices, however, even when he was using the disc ring, sows engaged actively with their environment, grazing, browsing, foraging, and enlarging the sides of the wallows in summer and ringing did not diminish their daily activities.

Editor's note: although septum rings cause less mutilation than those placed in the disc rim, Compassion in World Farming believes that alternative methods should be used to manage pasture. These include lower stocking rates and frequent rotation (see Pig Case Studies Sweden 1 and United Kingdom 4).

Paul has well-drained soils suitable for pasture pig raising and uses a regular annual crop rotation based

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Summer housing for farrowing sows

on a five year cycle. The rotation begins with pigs on the pasture. This is then rotated with a variety of organically-produced crops that provide both feed and bedding for the pigs. Although the rotation helps with the build up of health problems, Paul uses dewormers and vaccinates according to disease problems that arise on his farm or in herds surrounding his farm.

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Paul Willis sets a high priority on providing lush pasture for foraging and nesting

Dry sows

Dry sows are loosely housed in bedded barns with access to the outdoors on lots adjacent to the buildings. They are kept in stable groups of 15 with the boars who remain with the sows after breeding is finished. In the winter, barns are deeply-bedded and straw is replenished weekly to permit composting and heat production from the beds.

Farrowing sows

The key welfare aspects for the sows are:

- Small, stable family groups
- Comfortable quarters for farrowing and materials for making nests
- Ability to interact freely with their piglets, including limiting nursings as piglets get older and less dependent on milk
- Continuous access to fresh water and fresh feed from "self-feeders" so they can maintain body condition during the comparatively long lactation

Pregnant sows are brought to the farrowing paddocks about a week before they are scheduled to farrow. The paddocks measure 0.6 hectares and are surrounded by electric wire fences. The electric wire is first placed at sow eye-level and is then lowered to piglet eye-level once they are born. However, some piglets still find ways to explore neighbouring paddocks for a short time. Tractors and other wheel-propelled equipment can generally be driven over the fence. Insulated handles are placed at various places in the fence to ease management.

Typically, 20 pregnant sows are placed in a paddock. When the first 15 sows give birth, the 5 sows who have not yet given birth are moved to the adjacent paddock where they are grouped with additional sows due to farrow. Because the paddocks are relatively large, social adjustment is smooth. For piglet survival, all piglets in the same paddock should be born within a 5 to 7 day period.

Nesting behaviour



The finished nest

A successful farrowing

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Generous amounts of straw (oat or wheat or barley) are placed inside each hut prior to farrowing as nest-building material for the sow. Sows also gather vegetation with which they build nests. The straw and vegetation create a bedding pack underneath the sow and piglets that raises them above the ground. The straw helps seal the perimeter of the hut to prevent rain from washing in. New bedding is also added from time to time, especially in periods of heavy rain, to keep the bedding fresh. In the heat of summer, Paul places a block under the rear of the hut to raise it several inches above the ground, enhancing the flow of air through the hut.

In the winter months, Paul moves some of his sows to farrow in a barn with deep-bedded pens. The entrances to the pens are fitted with rollers that keep piglets in the pens for the first several days while allowing the mothers to leave and return to the nests. After piglets start climbing out of the pens, Paul removes the rollers and all the piglets and their mothers can mix freely. Through a doorway protected by a rubber flap, the pigs can go outdoors to eat from a self-feeder or bask in the winter sun. In winter, hoop buildings are also used that contain deep-bedded farrowing huts brought in from the pasture and placed along the sidewalls of the building.

Because of the healthy environment and ad lib feeding during the lactation period, Paul's sows are viable much longer than sows in confinement systems. Some sows are not culled until they have had 8 or 9 litters.

Piglets

The key welfare aspects for the piglets are:

- The piglets are not subjected to tail-docking
- Teeth-clipping is not practised, but teeth-filing reduces the sharpness of the needle teeth to prevent injury to neighbouring piglets' faces when competing at the udder
- Late weaning at six weeks which minimizes stress by removing the sows from the paddocks/rooms and letting the pigs stay behind

Within the first 24 hours after giving birth, Paul retrieves piglets from inside the huts to vaccinate, castrate, and file their needle teeth. Iron shots are unnecessary since sufficient iron is acquired as piglets root in the soil. Clipping of needle teeth is not permitted under AWI husbandry standards due to the potential for cracking the teeth and causing pain. Removing piglets for these processes appears to be less

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Fresh water is continuously available

In addition, various types of wood or steel shelters, some from salvaged materials, provide shelter to small groups of pigs or sows. Sows naturally farrow separately in individual nests, later bringing their piglets to rejoin the social group. Providing both kinds of accommodation allows for these natural behaviours.

Summer and winter quarters

Summer quarters



Straw is added before and after the sows farrow in individual huts



Sows with older piglets can shelter in groups

Winter quarters



The temperature is -6°C, but the pigs choose to go outside to forage



Adapted Swedish free-stall farrowing system



A second adapted Swedish design



Sow nesting in winter farrowing hut

© Diane Halverson/Animal Welfare Institute

disturbing to the sow if they are performed within the first day rather than later when the sow becomes more active and protective. Piglets also become much more active and harder to catch as they get older.

When working with especially protective sows, Paul uses a small, folding aluminum panel placed between him and the sow as he retrieves and processes the piglets. Gently and slowly picking the piglet up by the hind legs reduces distress noises or squealing, thereby minimizing the disturbance to the sow. He places the piglets in a large plastic tub and then steps into a protective trailer or truck bed to carry out the procedures.

Live-born piglet mortality is very low as Paul and the other workers on the farm take measures such as twice-daily inspections of the piglets. Farrowing huts allow plenty of space and they are padded with many layers of straw.

Sows are provided with self-feeders from which they can eat at any time. Piglets receive 'starter' feeds in creep-feeders that only piglets can enter. One of the benefits of a large group of farmers working together is that they can exert demand on suppliers. This has been so for the Niman Ranch farmers who now have their own specially formulated piglet feeds supplied by a large feed cooperative, without the addition of meat by-products or antibiotics.



Self feeder system for farrowing sows (separate smaller feeder for piglets in background)

Typically, industrial pig operations routinely feed low-levels of antibiotics to piglets, in part to reduce the incidence of E coli scours at weaning. The routine administration of antibiotics is not permitted in the Animal Welfare Institute's Humane On-Farm Pig Husbandry Standards, nor in the Niman Ranch company's protocol. The healthy environment provided by pasture and bedding dramatically reduces health problems at weaning and thereafter, rendering the feeding of antibiotics unnecessary.



Once the piglets are two weeks old, the sow begins to limit lactations by denying access to her teats

Although the nursing sows and piglets are given unlimited access to feed which meets all of their nutritional needs, they spend much of the day fulfilling their instinctive desire to graze and root for food.

Piglets play and forage just as older pigs do and they can often be found chasing each other around their paddocks, gaining independence and showing their intelligence and good social skills. They are well-prepared to move to the quarters for growing pigs (pastures or deep-bedded hoops) at the end of their time with their mothers.

As the pigs grow, the sows instinctively begin to limit the number of nursings to preserve their body reserves. Piglets are weaned at 6 weeks of age by removing the sows from the pasture. Removing the sows, rather than the piglets, avoids adding the stress of leaving the home onto the stress the growing piglets are already experiencing from weaning. The piglets stay behind in familiar surroundings, with the scents of their mothers still in the huts and nursing rooms. The growing pigs remain on the pasture until they are sold or, if they have been born in the fall (autumn), until they are moved into straw-bedded barns or hoop houses where they are raised to market weight during the cold winter months. After the weaning period is over, sows are mated again.

Weaned, growing, and finishing Pigs

Almost every day of the year, Paul's pigs (typically 1,000 at a time, divided into seven different areas) have freedom to roam over their pasture. Paul says that on 20-degree days in the middle of the winter, they can have the most fun outdoors in the sun (20°F, -7°C). Their natural layer of fat keeps them warm as they play in the snow and, when it gets too cold, they stay warm in straw-bedded hoop houses. In the hotter months, the pigs might spend their days wallowing in the mud or napping in the sun.

'We treat our pigs with a lot of respect,' Paul explains, noting that he makes sure everyone working on the farm understands the animals deserve the best of care while they're in his hands. This good treatment combined with the good environment keeps the pigs extremely healthy and illness is rarely a problem. Paul does not use antibiotic feed additives although he treats sick and injured animals with antibiotics when they need them to get well. Pigs reach market weight of 110kg by 5.5 to 6 months of age.

In the winter, in straw-bedded hoop houses, an initial layer of straw or cornstalk bedding is laid 20cm deep on the floor. Bales of bedding are added each week. Typically pigs spread the straw themselves, but it is essential that wet spots are covered with fresh bedding as soon as they develop. At least 160kg of bedding per pig is used in the winter. A space allowance of 4.5m² bedded living area per growing pig is aimed for.

Boars

On the Willis farm, boars are housed in a group with the pregnant sows. They have outdoor access and access to bedded shelter. Although, like the pregnant sows, they are limit-fed, they have access to bedding for forage which not only affords them occupation but also prevents hunger. Boars are not nose-rung.

Management of straw and manure

Pigs eat the bedding. Therefore, it must be stored indoors to maintain its quality and to prevent formation of mould or toxins that could cause abortions, stillbirths or lowered immunity levels. Straw requirements are 2.0 to 2.5kg of straw per sow per day.

Fresh bedding is added until the end of the farrowing, gestation or growing cycle. That is, soiled straw is not removed until the cycle is completed and pigs have been removed from the barn. Paul also uses chopped maize stalks and soy-bean hay for bedding as piglets get older and strong enough to navigate through the heavier material. Sufficient bedding creates a porous mixture wherein free air space provides conditions suitable for aerobic microbes to flourish. This decomposition produces heat, water vapour, carbon dioxide, and ammonia (a process called 'composting'). Only ammonia is odorous and its emissions are low or negligible if farmers use sufficient carbon-rich bedding to prevent the beds from becoming anaerobic.

Maintaining the surface of the bedding pack in such a way as to provide a dry and comfortable environment for the animals will be sufficient to keep ammonia emissions negligible. The heat generated in the composting process helps warm the pigs and to keep the bedding dry. The composting process kills pathogens and parasites. When spread and incorporated in the soil, the soiled bedding fertilizes and builds tilth and soil organic matter. About half of the organic matter added to soil in solid manure is incorporated into the native organic matter pool of soils.

Conservation

Paul and Phyllis are both humane and conservation minded. They raise crops organically and also maintain a 15 hectare native tall grass/wildflower prairie on their farm. They have converted additional hectares of farmland to a wetlands and tallgrass/wildflower prairie through a permanent conservation easement. There is little of the original tallgrass prairie left in the Midwestern United States. It is especially rare to find native prairie-land that has never been touched by agriculture or development. For Paul and Phyllis, maintaining the original native prairie and restoring additional land to its uncultivated state has been an act of love and respect for nature that also characterizes their attitudes toward their animals.



Restored wetlands provide habitat for wildlife

Free-range pig production system	
Date of visit	
Certification scheme	Approved by the Animal Welfare Institute
Number of sows	200-300 at any time
Breed	Farmer's Hybrid (50-year-old breed no longer commercially produced)
Food	Feed made of corn and soy; virtually unlimited amounts of fresh alfalfa, clover and grasses from pastures
Average and maximum farrowings per sow	No set upper limit
Farrowings per year	2
% piglets stillborn	Generally no more than one per litter, especially in recent seasons
% live born piglet mortality	Generally no more than one per litter
Average number of piglets weaned per farrowing	8
Number piglets per sow per year	16
Mutilations	Castration & tooth-filing for new-born piglets; septum rings for sows
Weaning age	6 weeks
Growth rate	110kg by 5.5 to 6 months of age
Food conversion rate	3-4:1
Weight when sold on or slaughtered	110kg
Transport to slaughter	Less than 4 hours (180 miles)
Price to farmer	Approximately \$5-6 (4.5 Euros)/hundredweight (9 Euro cents/kg) quality premium above going market prices
Market	Niche (sold to Niman Ranch as premium meat)
Number of stockpersons	3, plus part-time help (Paul is also manager of the Niman Ranch Pork Company which takes a great deal of his time)
Number of inspections	2 per day (minimum)
Health problems	No major problems
Other welfare issues identified	Mutilations