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Developing a Woodlot for Sustainable Use

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Abstract

In this project several species of livestock will be used to develop a raw woodlot into a sustainable farm whose profits will benefit the farm family and the local community. The social normalcies of today allow people to purchase meat from a supermarket never knowing how the animal was raised or treated. Children and young adults are raised in a society that does not understand the hard work and dedication it takes for their food to be grown and processed. Whole animal butchery has become a thing of the past; much of the animal is wasted when sent to commercial slaughterhouses. Livestock can be used for a number of things other than becoming food for consumers. This project will utilize various species of livestock to transform the landscape of an 83 acre plot of land, provide a sustainable business for the farm family, participate in educating the public on the advantages of farm life, and explore ways to use the whole animal.

Developing a Woodlot for Sustainable Use

Introduction

A number of steps are involved in creating a sustainable forage supply for multi-species usage. 83 acres of wooded property that is completely undeveloped and raw are available. This project is the evaluation the property features and theoretical changes that must be made to meet the demands of a sustainable farm that can support the farm family and the local community with fresh farm raised food.

First, a logging company will be engaged to thin the timber out and funding generated will be used to buy and build necessary fencing. Next, sheep and goats will be released to clear out the thickets, weeds, and small trees. Then hogs will be placed in rotation to further the elimination of unwanted vegetation and to till the soil. Once the earth recovers and grass has established a thick layer of ground cover cattle, rabbits, and birds will be introduced.

In addition to the livestock, vegetables, fruits, and other edible plants will be grown on two to four acres to feed the farm family, sell locally, or to use as treats for the animals. Small classes will be taught in the large shop building that is already on the property. These classes will allow customers to purchase an animal and learn how to humanely kill, butcher, and even cook it. Customers can be instructed on how to care for a live animal including living conditions, reproduction, and maintenance. Having multiple species will allow expansion of the diversity and complexity of the classes.

Blueprint

The perimeter of the property will be fenced off with a 6 strand high-tensile electric fencing. The plot will be divided into paddocks. Paddocks will be divided by electric fencing or temporary fencing depending on the topography and what animals will be contained and where. The perimeter fence will also have scattered stands of Osage orange trees as a back-up precaution in case a fallen tree or some other incident that causes the electric fence to fail. There are pre-existing trails throughout the property that were made by long ago logging companies; some are eroded from use of fourwheeler trails, and others have become wide lanes thick with vegetation (Figures 1 and 2).



Figure 1. This is a trail that wraps around the perimeter of the property from the field.



Figure 2. An eroded trail being reclaimed by grass.

A corral area will be set up two acres width from the shop building at the front of the property. The corral will be split into four large round pens with gates that face a common alley and can be connected to form one large corral. Eventually with the addition of cattle, one of the round pens in the corral will have a solid walled working alley connected to it that curves around and comes to a shoot with a head catch for cows.

Between the shop building and the corral pens the fruit and vegetable gardens will be planted to minimize the sound and smell of the animals, create food for the family, and for aesthetic purposes. Hogs, goats, and chickens love vegetables and fruits that are over ripe.

Ducks and geese will eat the bugs that are attracted to the plants without damaging the roots or the harvest.

Behind the shop building a mobile home will be placed to facilitate the farm family should they need to stay overnight or have guests in the cabin. Next to the shop building, parallel with Tubbs road, a small cabin will be built. The remainder of the property will be split up according to topography and ease of access. A small pasture or pen will be reserved for sick or injured animals that will be far enough away from the healthy ones yet close enough to the building for the animal(s) to be checked regularly and protected from predators.

The quarantine lot is the pasture at the front of the property next to the corral and is where new animals will be brought to be observed before releasing them into rotation. It will be a two-acre pasture with a round bale placed on its end to feed the ruminants, because the lot will become over grazed very quickly. Hay rings can be dangerous; therefore, the hay will be placed directly on the ground. The hay left over will create a nice bedding area and will become good ground cover helping the grass in that area to recuperate faster.

Timber

The previous owner had the property evaluated and received an estimation on the price and quality of the timber. Pine, oak, and hickory trees with diameters of 12” or more that have an estimated value of \$75,000 and a grove of mature walnut trees are valued at \$37,500. That makes a total of \$112,500 for timber. This money will be used to pay for fencing, housing, and various other expenses related to the property or the animals on it. Due to the prices of timber being in a flux market the estimated value may change.

Before logging a forester will be engaged to walk the property and mark which trees should be selected for harvest. By having a forester create a harvesting plan unique to the

landscape and by selecting the appropriate trees, high grading and massive land damage can be avoided. Efforts will be made to preserve the walnut grove in order to practice silvopasture. The small ruminants and birds will be the only livestock allowed to gently forage the walnut grove. A valuable ancient species of tree that can be used for fencing is called Osage Orange. Wayman (1985) :

“If planted close together, Osages would grow only to about 20 or 30 feet, never attaining the height of most deciduous trees. Consequently, they made perfect field borders: They could contain livestock without shading crops excessively. Besides, it was a lot easier to plant trees in lines around fields and pastures than it was to erect and maintain rail or stockade fences.”

According to Fisher (2015), “Nineteenth-century farmers prized the wood because it is so good for making tool handles and fence posts.” Osage Orange trees will be planted along the outer perimeter of the property where modern fencing is troublesome or impossible to install, creating a natural barrier against coyotes and other predacious animals that may be interested in the livestock. The majority of the plants will be coppiced annually, allowing them to grow into a tangled mess of a thorny hedgerow for the remainder of the year. Eventually, the tree trunks may be harvested and used as replacement fence posts.

Herd and Land Management

One of the main concerns about this particular property is the terrain. The topography of the land is very hilly with elevations of two feet in difference every few feet in some areas (Figure 3). This can present a problem for certain animals. The layout of the land was considered when researching and comparing animal breeds to use to improve this property, and the breeds chosen for this project will benefit the most on the available forages (Figure 4). In

order to maintain the health of the trees that are left behind only small herds of animals will be placed on a single plot at a time and will frequently rotate them throughout the property.



Figure 3. This image depicts extremely steep and rugged terrain.



Figure 4. This picture is an example of the many different forages available.

To promote the diversity of forages a mixture of warm and cool season grasses will be dispersed every spring and fall respectively, each year, until a lush forested savannah has been developed. The root systems in the grasses will hold the soil together to further strengthen the battle against erosion. There are several advantages to using a grass fed system. Most of this property already has a thick ground cover with healthy vegetation (Figures 5 and 6) Once a thick ground cover is re-established mob-grazing can increase grass health and provide a profitable marketing strategy.



Figure 5. Clover is in dense patches in areas with plenty of sunlight.



Figure 6. Ground cover is thick even in mostly shaded areas.

Specific breeds were chosen of various types of livestock to complement this piece of land as well as provide the farm family with a sustainable food source. The best way to keep livestock happy, healthy, and at optimum productivity is to visit and observe the animals every day. Daily human interaction will increase the docile nature of the animals implemented in this project and provide a better understanding of their unique needs and benefits. By using this hands-on technique, action can be taken quickly when an animal becomes sick or injured, if fencing is damaged, or if herd protection needs to be increased, or many other possible situations.

When examining traits in animals from each species docility will be a priority. Livestock should be easily manageable and even friendly. Problem animals will be sold or butchered. Reproductive efficiency and ease of birthing would be the second trait considered. Each animal that selected will come directly from the farm they were born on. This presents the opportunity

to see what kind of conditions each animal is used to, the farmer's management practices, type of feed or roughages used, fencing, the animals' daily routine, and what kind of equipment the animal is accustomed to. The farmer can be asked directly about each individual animal, which can be very valuable information one rarely gets from a sale barn. The farmer will not have to pay for transport and the origins of the animal can be traced back to the exact farm should the animal present problems. Avoiding the sale barn will significantly decrease the amount of stress the animals will be under and will avoid exposure to many diseases and other illnesses typically found at a sale barn.

Detailed records will be kept for each animal. A folder will be created that corresponds with the tag or tattoo number. The records will include the day the animal is purchased, its weight, age, sex, and any prior history received from the animal's previous owner. Also included are any vaccinations given, reproduction history, injuries or illnesses, and the amount the animal was purchased for. Once the animal is established on the property the records will be continuously updated until death or sale of the animal. If the animal is sold a copy of its records will be sent with it, so that the customer will have full knowledge of what they are buying.

Every farmer expects to lose livestock throughout the year for a number of reasons. If an animal is not found quickly enough after death and cannot be sent to the lab, then a potentially large dead body may need to be eliminated. Many farmers that move their dead to a sacrifice field and cover the body with limestone. Others bury or burn their dead animals. The idea behind composting deceased animals by using a wood chip composting pile, is that the animal becomes fully broken down into useable material. Composting consists of covering carcasses with wood chips which will cause complete decomposition over a period of months. The

compost is safe and can be spread on pasture as a wonderful organic fertilizer. This composting system would be the best fit for the farm.

The animals will need a water source. A creek runs through the property and can be dammed up to collect water. There are natural springs throughout the area and will need to be located so that they can be used to their full potential, whether its filling a watering trough or adding volume to a small pond. The creek can be very steep in some places, and has a lot of fallen trees and other debris collected in it (Figure7).



Figure 7. This depicts a creek bed.

Biosecurity

Animals will be quarantined for 60 days before being moved to Pasture 1. The first 30 days the animals will stay in the groups they arrived in, just in case one of the groups happens to be sick or carrying something the other groups have not been previously exposed to. This will be an appropriate time to tag or tattoo their ears for easy identification and record keeping on each animal.

After the initial 30 days has passed all the small ruminants will be combined together so that their behavior as a whole herd may be observed before releasing them onto their first pasture. This will allow enough time to familiarize the farm family and equipment with the animals so that they will be accustomed to meeting every day for snacks or supplemental feed. Herding the animals for routine maintenance such as hoof trimming, vaccinations if needed, and general health checks will be easier if they are conditioned to gather together every day at a routine time by ringing a bell or some other auditory signal, and then giving them a treat or a reward. The quarantine time will also allow the farm family to observe the personalities and behaviors of the herd so that they may better identify individual animals when they are having problems, stressed, or sick.

Diseases and parasites can travel from farm to farm via people, animals, or equipment if proper precautions are not taken. People from other farms will be required to remove or clean their boots before entering the property. Animals new to a herd or flock will undergo a 30-60-day quarantine before joining the other animals. Secondhand equipment will be scrubbed with bleach water and allowed to sun dry for several days before use. Equipment and pens will be cleaned between each group of animals. Younger animals will be handled before older animals, so that the immune systems of the younger animals will not be compromised. Bleach and water

will be kept on hand to sanitize boots after walking through a possibly contaminated area. Handwashing stations and rubber gloves will be available to any persons handling animals in an effort to reduce the risks of zoonotic diseases.

Small Ruminants

After the timber is cut and the perimeter and internal fences built a herd of small ruminant animals will be released to help improve the land by clearing brush and unwanted vegetation (Figure 8). These ruminants will consist of a combination of sheep and goats. They will feed on the many varieties of high quality forages naturally available throughout the property with a highly restricted supplementation of hay. Releasing ten goats and ten sheep together in a herd to let them roam together will maximize their brush clearing capabilities, because the two species eat a variety of different plants. Electric netting will be used to manipulate the ruminants into areas that are in need of being cleared.



Figure 8. This image displays a huge overgrowth of blackberry brush located on Pasture 1 perfect for goats.

Selection Process

There are several farms and ranches that sell both breeds of goat and sheep that have been chosen to use to clear the brush and undesirable plants that have taken over the land. The breed of goat that had the most qualifications to properly groom the property is the Kiko. Dr. David Fernandez an extension livestock specialist states in his article that Kiko breeding is preferred by brush control goat operators because “they tend to have fewer parasite and hoof problems. (p. 3)”

The popular opinion about the American Blackbelly sheep breed is that they are an exceptionally hardy animal though they can be on the scrawny side at times, and game ranchers love to purchase the large rams for customers to hunt. Hair sheep tend to have a better quality and flavor of meat compared to that of wool sheep. American Blackbelly breeders can be found in a few southeastern states such as Kentucky, Missouri, and Illinois.

Goats.

The Kiko has an exceptional reputation for foraging, kidding ease, mothering ability, parasite resistance, less susceptible to foot rot, and a generally hardy breed which makes them an excellent choice for my overall goals. According to the article “Goat Breeds Kiko” on Extension:

“The primary characteristic of the Kiko goat is its hardiness and its ability to achieve substantial weight gains when run under natural conditions without supplementary feeding. In addition, the female is capable of conceiving, carrying and giving birth to and rearing multiple offspring without intervention under less than ideal conditions. The Kiko is an aggressive forager, capable of thriving under conditions of feed deprivation.”

Breed standards as described by the Canadian Meat Goat Association (CMGA) provide a general guideline to follow when choosing breeding stock and herd replacements. The breed standards recognize the correlation between effective production and physical qualities that will result in the optimal animal.

The most common coat color for the Kiko is white, but all other colors and patterns are acceptable. The coat may be different in various environments; it can range from short and smooth to very thick. The Kiko goats are preferred to have a darker pigmentation to their skin, but lack of pigmentation is acceptable. Wattles are permissible, but not extremely common. Brisket should be wide and balanced in size when compared to the body. Forelegs should be parallel, evenly set, strong, and attach at the elbows with proportional angulation. Well-formed hooves are a must on every animal. Ears should be of medium length and not overly drooping, but not completely erect either. The neck should be well muscled, of medium build, and should appear to flow into the forequarter. Ribs should be well-sprung with a great heart-girth. The Kiko's back should be straight and sturdy with a lengthy, wide, and well-muscled loin. The goat must have a large, but proportionate, capacity for ingesting the maximum amount of forage while relying on minor supplemental feed. The rump is long and wide sloping slightly downward from hips to pins. The CMGA suggests thigh muscles must be thick, but not excessively, all the way down to the hock are desirable. Hocks should be angulated correctly when observed from the side. Legs should be almost straight and parallel when observed from the hind end. The pasterns should be strong with durable, well-proportioned hooves.

The Kiko goat can range in size from medium to large framed, with the bucks being noticeably masculine and considerably larger than does. The horns of a mature buck should exhibit a narrow spiral. Horns should not appear straightened or be too close together. Bucks

should not have horns that are tightly swept backwards to the point of touching the neck. The neck should be of medium thickness and length while also being well-muscled.

Does should appear feminine and have a wedge-shaped body that has a great capacity for carrying many young. Does should have a feminine head with a broad muzzle and large, unobstructed nostrils. The CMGA specifies that Kikos are highly fertile, very prolific, and have excellent mothering abilities. Does can birth and raise multiple kids on natural conditions without supplementation and still have a high daily gain. Thigh muscles must not be too predominant in order to avoid kidding problems. The udders should be of moderate size and well hung with two obvious, well-placed, small or average sized functional teats. Small non-working teats are acceptable as long as there is at least one functioning teat. The CMGA advises that does must be very fertile, kidding multiple kids during each parturition. Kiko's should kid very fast and easy without human interference.

There are many undesirable characteristics that need to be considered when searching for Kiko goats. The CMGA advises that any goat giving the impression that it is of the opposite sex is to be discounted. Abnormally long legs are not acceptable for a healthy animal. Should a goat have toes pointed out or in, feeble pasterns, or loose shoulders they should not be purchased to avoid production problems. The Kiko should not have dull eyes, a weak head, or a convex or concave profile. A slab-sided body or a very short back can be deemed undesirable.

Hindquarters should not have a rump that is too steep, thighs with too thick muscling, sickle or cow hocked, frail pasterns, or meager angulation in the hocks. Small testicles or a divided scrotum are unwelcome features for a buck; and poorly attached udder, large teats, or more than two working teats for does are also unwanted features.

Some common defects within this breed may appear inside the herd, and it is suggested by the CMGA that the animals presenting the defects should be culled. Jaw abnormalities such as malocclusion or overshot or undershot jaw of more than 5 mm will not be tolerated. Any Kiko goat with a roman nose, wry face, or experiencing total blindness will not be kept within the herd. Any goats with hoof problems that affect the goat's ability to move and function normally should be culled. Bucks with a completely divided scrotum, only one testicle, or abnormal testicles should be removed from production. The CMGA strongly advises that animals exhibiting qualities of the opposite sex should be culled.

Sheep.

The American Blackbelly have many quality characteristics; the rams can be used for trophy mounts due to their large beautiful horns, ewes lamb with ease and make quality mothers, they are a prolific breed, can survive off of low quality forage without much supplementation, have a certain amount of parasite resistance, and because they are a hair sheep they will require less maintenance. An article about American Blackbelly sheep on Hobbyfarms (2011) states, "American Blackbelly sheep are relatively inexpensive, and shepherd's costs will be minimal because the breed doesn't require shearing or high-quality forage."

The Barbados Blackbelly Sheep Association International (BBSAI) have created guidelines describing the breed's standards. These guidelines should be followed closely in an effort to get the best productivity and forage capabilities from the sheep. The American Blackbelly sheep is of average size and has a badger-face appearance with black markings on the face, chin, chest, legs, belly, and inguinal region. There are black markings on the forelegs from the knees down. This breed exhibits a roman nose and a noble stance. The head of the ram and ewe are noticeably masculine and feminine respectively. The muzzle is broad with firm lips and

it is essential that the incisor teeth meet the dental pad. The inside of their pointed ears should be black and stick out parallel to the ground when alert. The neck is stout and well-muscled with an armor of roughed hair. The shoulders should be flush against the body with well-muscled upper arms and shoulder blades. When observed from the side the forelegs should be straight. The BBSAI states that this breed is known for its ability to jump and should have strong springy pasterns. When viewed from behind the hind legs are straight with a long sloping rump and strong hindquarters. Proportional legs should be long, trim, and sturdy ending at well-formed black hooves. The body should be wide and deep with a large capacity for consuming forages. These sheep should have level backs and raised withers. The tail is long and reaches the top of the hocks and has a distinctive white tip of no more than 1 ½ inches. The coat color, aside from the black markings, can vary from light fawn to brown and from red-brown to a deep mahogany red.

The BBSAI discusses a few undesirable characteristics that can occasionally be found in American Blackbelly sheep. Floppy or dwarfed ears and wattles are a disqualifying traits. Horns cannot hinder the animal's quality of life, and should not have horn buds or loose scurs at maturity. Legs that are weak or appear cow-hocked are undesirable traits and should not be allowed. A small amount of wooliness is acceptable; however, the sheep should be culled if it requires shearing. Any white found on the coat, excluding the tip of the tail, is not acceptable.

Reproduction

Synchronizing estrous among the small ruminants will not be necessary, but instead they will be allowed to mate and kid or lamb naturally without help. The births of new herd members, their growth, the mothers, and their mothering abilities will be recorded so that it is known which animals to keep in the herd and which ones to cull. If a mother births multiple kids

or lambs without help and successfully rears her progeny each time, then the female offspring of those mothers will be kept as replacements. If the mother is not caring for her kid/lamb, her milk ducts are malfunctioning, or she gives birth to a stillborn or a genetically mutated kid/lamb, then she will be added to the cull list. If a kid or lamb has a serious deformity, genetic mutation, or does not gain weight efficiently then it too will be culled from the herd.

When the cattle are introduced; recently weaned lambs and kids will be added to the cattle herd to create a flerd. The smaller ruminants will need to bond with the cows for at least 30 days before they can be released all together. During this bonding period the small ruminants will be provided with a creep for extra protection and supplemental feed.

Rotation Timing

The animals will be introduced to Pasture 1 in early spring. The animals will be left on the property until it has been sufficiently browsed and grazed upon. Routine checks will have to be made to make sure the herd is getting into the areas that need to be foraged. Temporary fencing or netting may need to be set up in order to force them to clear a specific area. This pattern will continue for about two years, then hogs will be implemented onto the property starting with a freshly browsed and grazed Pasture 1. The hogs will follow the ruminant's rotation of the pastures. In the late fall after Pasture 1 has been tilled by the hogs the ruminants will be placed back into that pasture and supplemented with hay and grasses; the seeds will fall from the hay and grasses and will grow into a pasture in the following spring. Seeds of desirable grasses will be distributed by hand to increase the chances of more vegetation. The ruminants will continue to rotate on the pastures the hogs have already tilled, but not bring the hogs back to a pasture that they have already visited. Eventually the hogs will end up at Pasture 6 and stay there.

Housing

One Porta-Hut will be placed on each paddock as shelter for the animals. Porta-Huts will be placed on areas high enough so that they will not flood and drain properly. These would be for the animals to take shelter in during adverse weather conditions as well as safe accommodations for parturition and the raising of young. All of the livestock introduced to this property should be able to use the Porta-Huts, except the cattle and rabbits.

Swine

A heard of hogs will be released onto the first open pasture; ten sows or gilts and one boar. As the hogs advance each lot will be seeded with a mix of warm and cool season grasses. For this project a breed of heritage hog native to this area of the United States called the Mulefoot hog has been chosen. This critically endangered breed was selected for several reasons. First, the Mulefoot hog is accustomed to living in a climate similar to that of the Ozark region, Southern Missouri and Northern Arkansas, making Western Kentucky a fine home for this breed. Second, the Mulefoot is a dark skinned pig meaning it will be less likely to burn in the sun and its non-cloven feet will help it navigate any muddy or wet terrain with decreased chances of foot-rot or foot related problems. Third, these hogs are very adept at foraging and are easily self-sufficient. The docile nature of this breed should make it relatively easy to round them up when vaccinations, castration of piglets, or general maintenance is necessary.

The Mulefoot origins are unknown, but people have speculated that they are a combination of Spanish hogs crossed with a Choctaw breed from the 1500's. However, the breed wasn't standardized until 1900 when it was valued for its fattening ease and production of lard, meat, and its exceptional hams (1919). Mulefoot hogs are critically rare and there have

been fewer than 200 purebred hogs documented as of 2006. Most purebred Mulefoot hogs today originated from the Holliday herd that was located in Louisiana, Missouri. Mr. Holliday raised these hogs for 40 years and often reminisced about populating the small islands on the river with the Mulefoot in the fall then collecting them again in the spring, until the Army Corps of Engineers made it illegal in the 1950's (Powell K., 1996).

Selection Process

To obtain this rare breed, the Mulefoot breeders of Maverick Heritage Ranch that purchased the remnants of the R.M. Holliday herd from Mr. Holliday in April of 2006 (*American Mulefoot Hogs*) would need to be contacted. "We typically have mulefoot piglets available from unrelated bloodlines. Sows, bred sows, gilts and adult boars are available occasionally. If you are interested in starting your own herd of this exciting breed, raising a mulefoot for freezer pork or would like a large and loving pet, please visit our How to Buy Livestock page." (*American Mulefoot Hogs*). As a secondary option, Riverplains Farm located outside of Knoxville, TN sells non-papered purebred Mulefoot piglets (Nicely, 2010).

The guidelines set by the American Mulefoot Breeders Association (AMBA) in 1917 will ensure the most ideal animals will be selected for the breeding program. The Mulefoot hog has certain desirable and undesirable characteristics that are important to take note of when purchasing. Each hog will be required to have a reasonable disposition; easy to handle, gentle, and preferably friendly.

In reference to the guidelines of the AMBA each hog should have a thick black coat offering a good cover of fine hair that is acceptable to have white tips. Body condition must present healthy, clean skin, show personality, and be actively bright. By the age of two years and older the boars must weigh a minimum of 500 pounds, and the sows should weigh in at 450

pounds at the same age. At one year of age 300 pounds for both sexes is acceptable. The head of the hog should be small in comparison with the size of the body with a large width between the eyes and its face can be dished or straight. The eyes should be clear, with luster, and reflective. The hog should have medium length ears, somewhat tipped forward and pointed with a thin tip. The neck should appear petite, thick, broad, and rounded. The jowl line should be deep enough to nearly reach the point of the shoulder and a full wide jaw. The shoulders should be wide and even with the neck and along the back with an oval shape at the top. AMBA suggests that the chest be large and full behind the shoulders reaching deep and wide from top to bottom. The back and loin should have a uniform thickness from quarter to shoulders, slightly rounded or smooth even surfaced. The sides of the hog should be profound and full equally located between the shoulders and hams outspreading down into the contour of the belly with well sprung ribs. The belly should appear tight and protrude evenly on each side with lowdown flanks. The hog should have wide and thick hams that extend down the majority of the hock. The rump should display a slightly curved slope from the loin to the root of its tail. Strong feet and legs are a desired feature, legs must be of medium size in proportion with the body, straight, and nicely narrowing towards the feet. The AMBA recommends that the tail be of medium length yet large at the base and evenly tapering to the tip.

The AMBA also suggests many undesirable characteristics that I would not want bred into my herd. Swirls, large white patches, or coarseness of the hair of the coat are not welcomed. The animal should not show signs of being stupid, clumsiness, or extreme lethargy. Narrow space between eyes or large drooping ears are objectionable. Eyes must not be dull or obstructed by excessive fat or wrinkles. The animal's neck should not appear frail or thin. The jowl should not be skinny or lack fullness, or be sagging and wrinkled. Shoulders cannot be narrow or

unevenly shaped at the top or the bottom. The chest should not look as if it is pinched at the top, flat, tucked behind the fore legs, or narrow. The loin and back should not give the appearance of being humped, swayed, hollow, or narrow. Straight ribs are definitely a negative characteristic as well as flabby or hollow sides. The belly and flank should not sag or be pinched up or narrow. Hams and rump should not be cropped too high in the crotch or be too narrow, short, or thin. Legs should be straight and sturdy without hocks or hooves pointed outwards or inwards.

There are four disqualifying physical attributes, according to the AMBA, when searching for Mulefoot hogs to purchase. The coat and skin color of the hog cannot have more white than black. The hog cannot be under two thirds of the average weight at a certain age; a one-year-old hog cannot weigh less than 200 pounds. The animal cannot be sterile or have total blindness. The hogs' legs cannot be deformed, have lame feet or a creased hoof. Another disqualification is not having a record of the pedigree.

Quarantine

All livestock need 30 days minimum observation before being introduced into a herd or released onto the property. This is to insure that the animals are healthy, eating well, vaccinated, and less stressed. A quarantine or containment area will be set up at the beginning of the 83-acre lot (Figure 9) that can comfortably hold the hogs without causing overcrowding or adverse living conditions. The containment area will be fenced using temporary electric fencing.



Figure 9. This area behind the shop building and to the left will be the hog quarantine area, it is flat and then has a gentle downhill slope.

Also, a quarantine will allow the farm family some time to handle the animals and get them accustomed to their presence, their equipment, and the hog's new environment. While the hogs are confined for a month or more their ears will be tagged and a report will be made for each animal, such as when a sow or gilt reaches estrus, any adverse effects of vaccinations, or any odd behavior or illnesses.

Estrous Synchronization/Detection

Detection of estrus, or standing heat, is key to high conception rates among most farm animals. Hogs generally go into heat every 21 days and gilts experience their first heat around

eight months of age. It is best to allow a female animal to experience their first two or three estrus cycles before breeding them for the first time. While the hogs are in quarantine the days they go in and out of heat will be recorded, so that a better estimation can be made on when they can be bred next. If they are all cycling at different times synthetic hormones may be used to synchronize the herd's estrous cycle if needed.

Hogs in heat will stand still when you apply pressure to their rump and will sometimes even push back. This rigid stance that the hogs assume is called the lordosis reflex and is physically exhausting for them, so they are often tired after about an hour if they have not been serviced and will stop exhibiting signs of estrus (Pitcher and Springer, 1999). Therefore, observation is the key to predicting when a hog goes into heat.

Since constant exposure to a boar may interfere with timing of litters or with estrus detection, artificial insemination may be used on occasion. Also, it is difficult to know if an unrelated male can be found to service the sows/gilts that will be purchased. According to Pitcher and Springer (1999) the best time to inseminate is 12-26 hours after estrus has been detected (Figure 10). The a.m./p.m. rule will be used, meaning the A.I. tech will wait 12 hours after a sow/gilt is in heat and then inseminate. A different breed of heritage hog may be used as a clean-up boar. A clean-up boar is a boar that services the female after a period of time in case the A.I. did not result in conception.

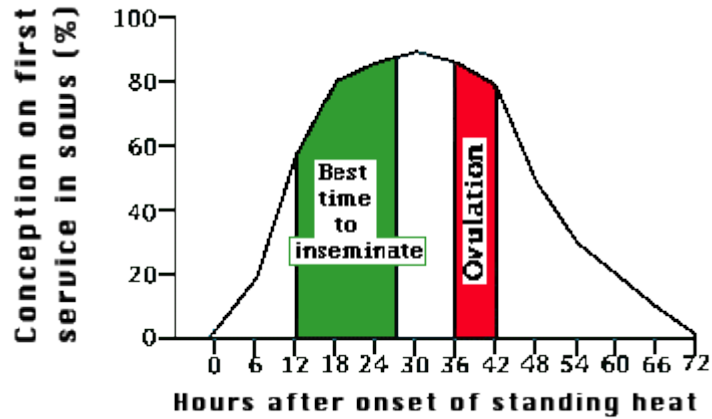


Figure 10. This figure illustrates estrus in swine and the best time to perform artificial insemination (Pitcher and Springer 1999).

Rotation Timing

The hog herd will be rotated every four and a half months to a new plot or whenever the ruminants have finished browsing. Before the hogs are moved to a new pasture any male piglets will be captured and castrated, vaccinations will be administered as needed, and tags or tattoos in the ears of the young. The hogs will continue to rotate until they have done all they can for the property. They will be moved before they damage tree roots or root away any topsoil. The hogs will get less time on pastures that already have too much erosion or very little flat areas.

Housing

The hogs can use the Port-a-Huts to escape inclement weather such as winter storms that bring heavy snow. These small shelters can be used as farrowing houses. The trees should provide plenty of shade as well as a barrier against excessive winds. The Mulefoot breed is very hardy and should not require much outside help.

Cattle

Eventually the grass will have grown for a few seasons and developed a strong root system. A small corral will be built next to the quarantine lot (Figure 11) along the side of one of the round pens with tall opaque sides, a curving alley, and a narrow walkway that ends in a head-catch. This design will make it less stressful on the cattle once it comes time for routine maintenance, artificial insemination, or loading for transport. The tall solid walls will keep the cows from looking for a way out. The narrowness to the alley way will stop them from turning around. The curve to the alley will not allow them to be able to see what is at the end of the alley. The head catch will open up to pasture or into an adjacent pen.



Figure 11. This field is two acres wide and six acres deep, has great ground cover, and an abundance of clover.

Selection Process

Once the pastures are cleared of unwanted trees, weeds, and debris then a specific breed of cattle will be selected to graze this property. Jerseys for milk production are an ideal choice, and AI can be used to crossbreed for hybrid replacement heifers and meat calves. Chosen cattle will be docile and calm. If a farmer has his cows rounded up, then the one that keeps poking its head up above the herd constantly looking for a way out will not be chosen, those cows are trouble. The cows chosen will be required to have a wide pelvis, appear to have sound legs, good udders, good teeth and dental plate. Expected progeny differences on all cattle and AI bulls will be checked before purchasing the animal or semen.

Quarantine/Observation

The cows and heifers will sit in quarantine for 60 days. During this time, the farm family will attempt to bond with the cattle the same as with the small ruminants and hogs. Observation and the recording of estrus with the aid of Estroject patches will occur during this time. The cattle will be slowly introduced to the facilities to ensure they have a good first experience so that when it comes time for artificial insemination, routine maintenance, or transport to their new owner, they will be less stressed. Keeping the cattle calm and as stress-free as possible is key to a healthy herd. Stress can negatively affect conception rates, immune response, and weight gain. When the cattle are loaded onto the sale truck they need to be at full weight so that the profit per pound can be maximized, but if the cattle are stressed they will defecate before being loaded which can cost several pounds of profit per cow. Keeping them calm and at ease will increase revenue as well as give the cows a better chance of fighting off any contagions at the sale barn, should they go to one.

While the cattle are contained in this area 45-60 day-old lambs and kids will be introduced into the herd to form a flerd. The idea behind this is to bond the lambs and kids together with the cows to form a grazing group that sticks together. If the small ruminants are bonded with the larger ruminants for a length of time they will stay together once released to free roam. This can help the livestock guardian dogs (LGD) to offer more protection since the ruminants will be less likely to break into separate groups.

Breeding and Estrous Synchronization/Detection

The time in quarantine will allow time to detect and record estrus and will help determine what needs to be done to synchronize the cattle. The Estrotek patches will be used to monitor estrus and then the AM/PM rule to artificially inseminate. The herd will be small and will not require a specific calving season that is dependent on the calving market. The calves will stay on the property for up to a year and then they will be slaughtered for the family's personal use and to occasionally sell at local farmer markets.

Rotation Timing

The cows will have the opportunity to graze each paddock beginning with paddock 1. When the grass is about four inches tall the cattle will be rotated to the next paddock. Moving the cattle to a different pasture once the grass has been grazed down to a minimum of four inches is important for pasture management and parasite control. The sheep and goats will roam with the cattle in an effort to maximize even grazing and browsing throughout the property. Mixing the small and large ruminant herds can have added benefits. One benefit is that cattle have a larger grazing range which will help the sheep and goats to conserve forage. If a paddock has

terrain that is unmanageable for cattle to traverse, then the flerd will skip that paddock and smaller ruminants that are not part of the flerd will be left to browse and graze it.

The flerd will be rotated every 24 hours in order to extend the life of the pastures. Mob grazing is a great way to take advantage of the free fertilizer the ruminants leave behind. Temporary fencing can be used to break the pastures up into smaller paddocks to concentrate browsing or grazing in problem areas.

Milking

Jersey cows are known for their milk, but are also known for their carcass quality and palatability as being one of the best. At least one Jersey will be needed for the cow share program. If there is a demand for it, milking rights will be sold for the cow and a class on how to collect and pasteurize one's own milk. The cow will be milked once a day allowing the calf to have access to her milk all night, then separating them in the morning, and milking her every evening. This will be the routine for a minimum of two months or until the calf's rumen develops and can feed off pasture. The milking cow will be lured into the barn using a bucket of treats or sweet feed, but cannot have access to grains to prevent the overproduction of milk. Once the cow becomes accustomed to going to the barn every night to be milked she will look forward to it and may even be excited about it knowing she will get treats, have her udders relieved by the milking, and be returned to her calf afterward.

Poultry/Fowl

Birds can be used for insect control, picking apart dung piles, meat and egg production, and some even serve as an alarm when predators are lurking. Cotton Patch geese are ideal for keeping in the garden since they eat undesirable insects without destroying plants and vegetables.

Khaki Campbell ducks can lay up to 300 eggs a year and are also excellent at removing harmful insects from the garden area. Guinea fowl can be released to free roam the whole property for insect and tick control. Chickens are perfect for scratching apart dung piles and eating fly larvae. Chickens can be released on a pasture that has just been mob grazed and see how it turns out, hopefully the livestock guardian dogs will not eat them. The chickens should not be allowed around the dairy cow(s) as much as possible, because chicken feces can stick to a cow udder and possibly contaminate the milk.

Rabbits

An A-frame will be built to support hanging wire cages for rabbits. Rabbits are very efficient in converting forages into meat, have highly fertile droppings, and are easier to process than chickens. These little animals produce minimal smell as well as marketable pelts, feet, and ears. They are quiet creatures so they can be kept closer the front of the property outside of the large shop building without causing a disturbance to the neighbors.

Producing rabbits can be equal to that of raising chickens, but with added benefits. They have a more docile nature and make almost no noise except for the occasional thumping on the cage floor. They require no preventative medication, estrus detection, or special equipment. The carcass quality is excellent being high in protein with less calories, cholesterol, and fat compared to beef, chicken, or turkey. The meat is white, very lean, yet mild, and can be used to replace chicken in any recipe. The meat is found to be a bit sweeter than chicken, but with a very similar texture.

Rabbits require a high fiber/low energy diet. From spring until the first frost hits the herd receives fresh grasses grown in the yard or from the neighbor's unused field that grows clover, alfalfa, timothy, and a various number of other grasses and legumes. This keeps feed cost low

and the rabbits happy since they prefer fresh grass to the pellets. The rabbits receive pellets and hay all year round, however, they consume roughly half the amount of pellets when fed fresh forages daily.

Rabbit manure is considered a cold manure, which means it does not need to be composted before adding to your plants. It is also richer in nutrients, such as nitrogen and phosphorus, than cow, horse, or chicken manure, all of which need to be composted. Dixie Sandborn (2016) says, “Fresh rabbit manure is approximately 2 percent nitrogen, 1 percent phosphorus and 1 percent potassium. Use it fresh, straight from under the hutch. It does not burn plants. Use the pellets to topdress your lawn, mulch roses, vegetables, flower beds and ornamental plantings, or supercharge your compost pile and create an earthworm heaven.”

Housing

Rabbits need to be sheltered from the sun and the heat during the summer months as most breeds cannot tolerate temperatures above 90 degrees Fahrenheit without some relief such as a high-pressure misting or fogging system, or simply some frozen water bottles to lay on. Fans would be a welcome addition by keeping the rabbits cool, deterring flies, and combating the ammonia build-up by speeding evaporation. Rabbits prefer colder weather to hot as long as they are kept dry. A cold wet rabbit is a dead one.

Another essential component to rabbit husbandry is a high quality wire floor and sides for keeping the rabbits clean and healthy. The square holes of the cage bottom need to be large enough for feces to fall through without collecting inside, but small enough to protect their feet from injury. A mat or something solid and non-toxic that rabbits can stand on to give their feet a break from the constant pressure of being on the wire is an easy prevention for sore hocks. Wire bottom and sides will help insure proper ventilation and makes herd observation easier.

Nesting boxes and extra hay need to be placed in a doe's cage once she has reached her 28th day of gestation or if its noticed that she is pulling fur from her dewlap. The doe will make a nest of hay and fur, if she does not then she may need to be removed from the herd. In extreme weather if its noticed that a doe pulled too much fur or too little, it can be fixed by removing the excess or pulling extra fur from her dewlap.

Breeding

A female rabbit, or a doe, does not ovulate until after she has been serviced by a male leaving the doe ready to breed at any time. A doe has two a two uterine horns each with its own cervix, but no uterine body, making it detrimental that a doe should not be left alone with a male, or a buck, because she may conceive two litters. Two litters can cause many complications and usually results in the death of the mother and/or kits. A doe can be carrying a litter in one horn and conceive a whole other litter in the second horn at any point during gestation of the first litter.

If a doe is unreceptive or does not lift her hind quarters to receive the male, then she may need to be checked. Check the rabbit by separating the folds over the genital area and ensuring that she is indeed female, this is usually the problem, young rabbits are often sexed incorrectly. The vulva should be a reddish or purple color and large or appear slightly swollen. The vulva should not be pale in color, or have pus, or discharge. There are a few environmental conditions that can cause a doe to become unresponsive. Some examples of adverse environmental conditions that affect reproduction would be extreme heat, unhealthy living conditions, illness, dehydration, or low-quality food. Likewise, a buck can become sterile when stressed in a hostile environment.

Rabbits will be bred every two months except when the temperatures are above 90 degrees Fahrenheit. A single buck can service three females in one day. One service is equal to three mating sessions in which the buck ejaculates three times and falls off the doe. It is good to breed several females at once or within days of each other in case a doe dies or refuses to care for her litter. This will ensure that there will always be a doe to foster kits that have been neglected, foster mother rabbits are less likely to reject a litter that is similar in age to their own litter. Kits only feed twice a day so it would be easy for a doe to foster a second litter.

Basic Rabbit Care

All animals need water, but each rabbit is in its own individual cage which requires individual waterers. When the rabbits are set up on this property a water delivery system will be installed using water barrels, a pump, and a hose that has a chicken nipple in each cage. At the moment the rabbits have 30 oz. water bottles hanging on each cage, which takes a lot of time and labor to fill and replace each day. In the winter the bottles freeze and have to be thawed twice a day. The new watering system can be fitted with a water heater or a heated or insulated hose. Each new rabbit will need to be quarantined away from the rest of the herd for a month before adding it to a cage next to the other rabbits. New arrivals will be checked for ear mites, bot fly, and injuries.

Selection

A specific breed of rabbit will not be selected; rabbits will be chosen based on the physical characteristics of each individual. Each rabbit will need to be fully examined for any deformities or signs of illnesses before being purchased. It is very important that the rabbit's top front teeth slide over the top of the bottom teeth to avoid dental disorders such as malocclusion

of incisors. The genitals need to be fully examined as well. Mature males should have hanging hairless testicles that are free from sores and without scarring, the mucus membrane next to the penis should be clean, and their living conditions should be assessed. Male rabbits can become sterile if exposed to too much heat in the summer. Female rabbits should have a rounded shape when observed from the side, a clean vulva, at least eight nipples, and a wide pelvis. All rabbits will be selected for finer bones, thick muscling, and higher growth ratios. Ears should be clean and stand erect, flopped over ears can mean heat stress or a recessive gene is present.

Livestock Guardian

There are several types of livestock guardians, but with the given land and types of animals that need guarding, dogs will be the best suited for protection. The dogs will be implemented on the very first day that the first set of sheep and goats are added. This will ensure that the dogs become familiar and even bonded to their herd. After reviewing the various breeds of guardian dogs there are a few breeds that are acceptable to use for this farm's purposes; including Anatolian Shepherds, Great Pyrenees, Kuvasz, or a mix of two purebreds. A breeder is the best way to purchase livestock guardian dogs. However, the dogs for this project will be purchased from local farmers advertising their LGDs for sale that have already been trained and bonded to protect livestock.

Selection

Local farmers agree that it is best to buy pups that have been raised around livestock, have been socialized, and whose parents are also livestock guardian dogs. Buying them at about two years old will ensure that the dogs know how to keep predators at bay and bond with the livestock they are to be guarding. Replacement dogs will be added as young pups every few

years in order to keep their numbers up and to ensure the pups learn from the adult dogs. Dogs with a dark patch above their nose are more resistant to sunburn.

LGDs should be friendly enough with the farm family so that they can receive medical attention or other forms of routine maintenance when necessary, but excessive bonding should be avoided. Should a dog persistently wander off of the farm or fail to bond with the livestock, then the dog will be returned to the seller or removed from the farm.

Breeding

Attempts will be made to get a breeding pair and allow them to breed naturally. Once the pups are ready to be weaned they can be sold as LGDs. Two sets of dogs of different breeds will be added to the property, one set to roam with the flerd and the other for the perimeter.

Basic Care

The dogs will be fed dry dog food once a day when the other animals receive supplemental feed. To avoid sheep measles and other diseases dogs will not be allowed to eat or chew on carcasses. Some dogs hunt and eat small game, however dogs that harass or kill deer will not be tolerated. Water will be available to them via the creek or the livestock water troughs. During the spring and summer months, and into early fall, the dogs will need to be dewormed and given monthly flea, tick, and heartworm preventatives. A vet will be contracted to vaccinate and perform yearly checks on the dogs. The dogs can seek shelter in the Porta-Huts if the weather becomes too hostile for them or their puppies. Spiked collars with tags indicating contact information and that they are livestock protectors will be applied for the protection of the adult dogs.

Honey Bees

Once the garden has been established a beekeeper will be hired to set up a hive and do routine maintenance while educating the farm family on how to care for the bees. After a few seasons the bee hive and colony will be bought by the farm and maintained by the family. Honey bee populations have taken a turn for the worse, each year more and more are being destroyed by parasites, pathogens, and in part humans disrupting the bees' natural environment (Pettis and Delepane, 2010). A few acres toward the front of the property and alongside the road (Figure 12) will be dedicated to patches of wildflowers. Honey bees can be an extremely valuable asset to a farm such as this. The honey and wax can be sold or used in the crafting workshops, recipes, or in some cases in supplemental feed for ruminants exhibiting lethargy or energy deficiencies.



Figure 12. This image is of a sloping hill at the front of the property where wildflowers will be planted for the bees and for aesthetics.

Classes

Customers that are interested in taking classes or workshops can rent or purchase an animal from the farm depending on the class. Techniques on how to properly handle each species without causing harm or high amounts of stress to the animal or injury to the handler can be taught. Animal husbandry, caring for young, and general maintenance can be taught in lectures. Workshops can be given on how to use animals and equipment, biosecurity, processing meat or milk, and how to use the remains. These classes can be designed to cater to youth organizations, college groups, or individuals. Most workshops, classes, and lectures can be given inside of the large shop building on the property (Figure 13).



Figure 13. The large shop building contains an oven and stove, two deep large freezers for pelts or meat, two industrial sized refrigerators, and one full bathroom.

Processing

There are many ways to humanely kill each animal to prepare it for butchering, a bolt gun is appropriate in most cases. A customer can be instructed on how to kill the animal and dress it out while learning what to look for in terms of disease, parasite, or other maladies affecting the health of the animal or the person consuming it. Proper cutting of the hide is important if the customer wants to tan it at a later time. A sheltered area will be provided to perform the slaughter, and all the tools necessary to get the most out of a carcass. Services including traveling to a farm to teach a customer how to slaughter and butcher their own animals can be provided.

Livestock Management

Livestock management workshops and lectures for beginners will give customers hands on experience on how to safely shear sheep, trim goat hooves, check for worms and other illness or injury. The differing species of animals expected to be on this farm will provide a diverse variety of topics to discuss and more opportunities to sell products and services. Workshops can be given on this farm using the wide assortment of animals and varying types of care required for each species. Livestock management workshops can be extended to teach clients with their own animals on their own farms. Workshops can also be given on how to properly build rabbit hutches or other small animal enclosures such as chicken tractors.

Crafting

Crafting with animal remains is becoming more popular these days. Dehydrated rabbit hearts in a bottle are being sold as a novelty gifts on Etsy at very elevated prices. Still born

babies can be kept in jars of alcohol as wet-mounts. Bones and ears can be dehydrated and sold as dog treats, or they can be cleaned and bleached to use as part of an art piece. Smaller hides can be tanned with the fur on to sell as sewing pieces while larger hides can be used to make leather.

The most common ways of tanning hides can be done by using brains, egg yolks, or chemical agents. The customer will be encouraged to choose their preferred method. The proper tools and space along with assistance throughout the whole process will be provided. In an effort to minimize waste, undesirable organs and viscera can be fed to the chickens, guardian dogs, pigs, or added to the compost pile.

Milking Workshop

When there are cows and goats ready for milking; milking lessons and cow shares will be advertised online and in local farm supply stores. The customer will be offered the options of choosing from dairy cows or goats. Customers can also choose their milking schedule, whether it be morning, evening, or for an extra charge the farm family can milk, bottle, and deliver. Some clients may share one cow and only milk on certain days of the week. Other workshops can include how to pasteurize milk, make butter, produce cheeses, or create soaps.

Honey Bee Workshop

Adding honey bee classes and workshops will be a great advantage, not just for the farm and its plants, but also for the community at large. These classes will encourage others to start their own bee colonies in hopes of increasing bee populations and of course to collect honey and wax. Classes can be taught on how to care for bees, the proper equipment needed, and the life cycles of the insects. Workshops will be offered over how to properly use the equipment without

causing harm to the bees or the customers, honey extraction from the comb, and how to establish their own apiary.

Tourist Attraction

When this farm has all of the animals and educational features established it will be a major attraction to people not accustomed to farm life. A small three bed two bath cabin will be built at the front of the property next to the large shop building for guests to rent. The cabin will be fully furnished and maintained by the farm family. Each morning guests will be woken to help with chores. After the chores have been completed the guests will be offered breakfast at the farm house. Customers will be served food straight from the farm. Eggs, fruits, and vegetables collected during morning chores will be used for their breakfasts, lunches, and dinners. The farm family can slaughter new animals off the farm for guests or guests can be served meat that has already been slaughtered before their arrival.

Customers will be offered the opportunity to visit the farm and follow the farm family throughout the day to get firsthand experience in handling the animals. Customers will leave with a greater understanding of what it takes to successfully operate a farm and care for the livestock. They will gain knowledge on the many working parts that come with animal husbandry and meat production.

The farm is located ten miles south of Kentucky Lake, 30 miles from Golden Pond Planetarium and the nature reserve, and 25 miles to Murray or Paducah. Guests can enjoy lake activities, visit historical areas, or explore many of Western Kentucky's other tourist attractions after farm chores have been finished. Guests will be offered the opportunity to sign up for any of

the workshops, classes, or lectures taught by the farm family. Animals will also be available for them to purchase to take home as pets or as food.

Tools/Equipment

There are many technological advances that will make all of the farm work much easier. Tools will only be selected that can be easily afforded and that are necessary to the health of the animals or the farming operation. Heavy machinery can be very expensive, so it will be rented instead of bought. Scrap material can be used to build some equipment such as rabbit hutches, a head catch and milking stand for goats, and other small shelters for ducks or geese in an effort to cut down on costs.

Equipment for Herd Health

Bins for supplemental feed will be required for most animals. Bins will need to be rat and insect proof, kept dry at all times, and checked often for cracks or holes. A water source will need to be provided. It is undecided about how to utilize the natural springs on the property. There are no regulations on the waterways on the property, so small ponds may be created or spring fed livestock troughs for the larger animals. Since the rabbits will be in cages an insulated water line that has a chicken nipple in each cage will be used. The water will filter between two fifty-five gallon barrels and will be heated in the winter. The ruminants will need access to mineral licks throughout the property. There are concrete troughs that can be ordered or built to keep the minerals from deteriorating as quickly. Mixed mineral blocks will not be used, but instead a combination of individual minerals blocks will be placed throughout the property. This is so that the animals can choose for themselves what they need and to avoid an overdose of certain minerals such as copper or deprivation of selenium.

A chute and head gate will be needed at the end of an alleyway so that maintenance, health checks, or A.I. can be performed on cattle. Also needed for cattle would be A.I. equipment such as a semen tank and gun, milking equipment, and Estrogen patches. Emergency medications will need to be kept on hand as well as syringes and needles for all livestock. Nail and hoof trimmers will be needed to keep feet clean and free of injury. A head catch and milking stand will be required for milking goats and trimming feet.

Solar panels can be used to keep electricity running to the electric fences. Solar panels will be added to the top of the building that is on the property for lights, refrigeration of meats and hides, and to supply electricity to security cameras along the perimeter. Security cameras are an important resource in keeping the farm safe from animal rights activist and other natural predators. For easy transport of animals, a livestock trailer will be required. To get unruly animals to go where they need to be temporary electric fencing or netting will be desirable.

Shelters

The Porta-Huts and trees will be sufficient protection from the elements for the sheep, goats, pigs, birds, and dogs. The geese and ducks can take shelter in igloo dog houses packed with hay during the cold months. Cattle will be content with a dense wooded area. The rabbits will require hutches or cages, shade in the summer, and protection from moisture in the winter.

Bee Equipment

Bees will require a hive and proper hive equipment. Workers attending to the bees will need a smoker and special honey extracting gear. Workers will also need a specialized clothing to protect the person from bee stings as well as protect the bees from getting crushed. Hooded

bee suits are often white so that detection of bees on clothing is easy and they can be gently removed and placed back onto the hive.

Buildings

A mobile home that is already owned will be moved onto the property Behind the large shop building (Figure 14) for the farm family to stay in should the farm require overnight stays or if there are guests renting the cabin. The mobile home will contain at least two bedrooms, two bathrooms, and a fully equipped kitchen. A cabin will be built next to the shop building (Figure 15) closer to Tubbs road. The three bedroom, two bath cabin will be fully furnished with a king size bed in the master bedroom and bunkbeds in the other bedrooms. There will be a living room with two couches that pull out into beds. The overall capacity for the cabin will be eight guests at a time.



Figure 14. This half-acre lot has water, sewer, and electric hookups in place for the small cabin.



Figure 15. This photograph was taken behind the large shop building.

The Business Side of Things

This farm will be a business that will sell animals, meat, produce, and educational experiences. A business license and name for the business will be required to sell any of the commodities listed in this project. Meat handling permits will also need to be applied for. Before this farm can advertise the sale of meat or offer custom whole animal butchering services a yearly federal health inspection is required by the United States Department of Agriculture. The USDA must ensure that the farm is practicing good biosecurity measures in an effort to protect consumers from zoonotic diseases.

Conclusion

This project will explore old world customs using the land and each animal to its fullest capabilities. Educating the public of the importance of farming and how rewarding hard labor can be is one of the many benefits to this farm. Sharing knowledge on each animal and on the land itself will be a fulfilling and profitable role for the farm family. This farm will encourage the community to come together and support not just this local farm, but others like it. Once this project is completed the farm family will have a unique business that is mostly self-sustainable.

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