Practical Farming & Gardening



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NEW TEXT TO COME!!!!

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TABLE OF CONTENTS

RAISING HEALTHY CATTLE 4	ŀ
RAISING HEALTHY CHICKENS 6)
RAISING HEALTHY PIGS 8	;
RAISING HEALTHY SHEEP & GOATS 10)
RAISING HEALTHY CROPS 12	

RAISING HEALTHY CATTLE



FEEDING

Forages

- Cattle, sheep and goats have a complex (ruminant) stomach which requires a high fiber diet. Microorganisms in the stomach break down the fibrous food into nutrients that can be absorbed by the animal and used for growth, meat and milk production and reproduction. These animals chew their cud to help prepare the food for bacterial digestion.
- Clean water is essential and needed at least twice a day.
- Forages include pasture, hay, corn fodder, straw, beet pulp, residues from food processing.
- Young grasses and alfalfa are much higher in nutrient content than older ones. When pastures are grazed close to the ground the animals should be moved to another area for several weeks so regrowth can occur.
- Alfalfa should be cut for hay in the early bloom stage so that its highest food value is available to the animal. Alfalfa pasture or hay should not be fed alone, as it will cause bloating. A more coarse hay or grass should be fed before or with it.
- Silage (fermented forages) are made by chopping and storing corn or other grasses in a tightly packed form that eliminates air contact. These can be ideal feeds for cattle.

- Fertilizer applications to pastures will help increase grass production, and seeding new grasses and grains in pastures may lengthen the grazing season.
- Grains such as wheat and rye can be planted in the fall and the new growth grazed until snow cover and again in the spring, removing the animals in March if the grain is to be harvested from the crop.

Grains

• Shelled corn, sunflower seed meal, wheat, oats, soybeans should be ground to increase digestibility. These feeds must be used starting with small amounts and slowly increasing over several days. Severe indigestion problems may occur if this is not done.

Other Feeds

- Wheat bran, root crops including beets, turnips, potatoes and unused parts of garden vegetables, apples. If large, these must be chopped into pieces small enough to be swallowed or they may cause choking.
- Salt and a mineral supplement should be fed free choice.
- Combining feeds to make a nutritionally balanced ration is desirable for maximizing milk or meat production and can be prepared by someone trained in ration balancing.

CARE OF THE COW AND CALF AT BIRTHING TIME

- Birth should take place in a clean and dry area. Clean, dry pasture free of manure is good.
- If cow appears to have delivery problems or needs assistance it is important to be very clean. Wash hands and arms with soap and water and also the vaginal area of the cow before examining the cow internally.
- If pulling assistance is needed, pull when the cow pushes. Be gentle.
- After delivery, check the cow's udder for mastitis.
- Rub calf dry if mother doesn't.
- Disinfect the calf's navel cord by dipping it in an antiseptic as iodine or chlorine bleach diluted one part bleach to 40 parts water.
- Calf should get it's first milk (colostrum) as soon as possible (within one hour) in order to develop strong immunity against diseases. It should receive 3-4 liters in the first 24 hours. If calf is too weak or won't nurse, this may be fed through a stomach tube if you know how to do it properly.
- Dehorning calves when 1-2 days old can be done with caustic paste causing little pain:
- Clip the hair around the horn bud.Using an applicator, put a thin layer of paste on the horn bud.
- Immediately feed the calf a bottle of milk to help it forget the pain. Don't let the calf get wet or be licked by the mother or other calves for 24 hours.
- Good ventilation is very important in preventing respiratory illnesses in young animals. A strong odor of manure (ammonia) at the level of the calves' noses indicates a need for fresh air and cleanliness.

MASTITIS (BACTERIAL INFECTION OF UDDER)

- Contagious type: spread from cow to cow by milker's hands, milking machines, nursing calves, flies and teat contact with contaminated areas. Milker's hands and cow's teats should be clean and sanitized before cow is milked.
- Environmental type: caused by teats being in contact with manure, contaminated water, soiled bedding, teat injury.

- Subclinical type: milk looks normal but production and quality are reduced. Can be detected using the CMT or other tests.
- Milk from cows with mastitis must not be used for human food. If fed to calves it should first be heat sterilized.

MASTITIS TREATMENT

- Mild cases sometimes recover without treatment or with frequent milking of the affected quarter.
- Antibiotic treatment may be infused into the quarter using care to disinfect the teat end with alcohol and not touching the treatment tube tip with fingers or anything else.
- Severe cases having a hot or swollen, tender udder should be treated with infusion tubes and antibiotic/ anti inflammatory medications by injections into the muscle or veins.
- Treatment is not always successful.

INTERNAL PARASITES (WORMS)

- Parasite eggs are on pasture or any place fecal material is found. When the temperature and moisture are suitable, the eggs hatch into larvae.
- Larvae climb onto grass and are eaten by the grazing animal.
- Larvae grow in the stomach and intestines of the animal, drawing blood and nutrients, and may cause diarrhea, anemia and unthrifty animals.
- Diagnosis may be aided by microscopic examination of manure for worm eggs.
- Treatment is becoming more difficult as parasites are developing resistance to medications used.
- Management procedures that help reduce exposure to parasites and diseases include:
 - Pasture rotation. Stop grazing for several weeks to allow grass to regrow.
 - Avoid pasturing wet and undrained areas.
 - Break up manure pads to expose them to sunlight.
 - Pasture young animals on new areas that haven't been grazed for 3 or more months.
 - Don't place feed on the ground.

Bury or burn animals that die.

RAISING HEALTHY CHICKENS



ENVIRONMENTAL MANAGEMENT

- Chickens should be housed where they will have protection from predator animals including birds, rain, snow, wind and extreme temperatures.
- Clean drinking water is needed for all ages. Water containers should be cleaned daily.
- Feed should always be available and there should be enough space that the chickens are all able to eat at the same time. As the birds grow the feed containers should be raised so they stay at the level of the bird's shoulders. This will help prevent wasting feed.
- Baby chicks must be kept warm or they will not survive. A brooder is a device that provides heat and protection for the young birds. The temperature should be set at 35° C for the first week, and reducing it by 3.8° C once a week until reaching 21° C. After 3 weeks the heat may be removed except in very cold weather.

- Baby chicks will find food easily if they are placed directly on it. Water containers should never be more than one meter away from the chicks for their first week, and 3.5 meters after that.
- Chickens may be kept in outdoor pens located on grass pasture. The pens can be moved as often as necessary to provide fresh grass to them at all times. The manure will fertilize the ground for later gardening.
- If chickens attack or peck each other, causing wounds or drawing blood, the victims should be removed to another area. This problem can be reduced by trimming the beaks, removing about 1/3 of the upper and lower beak.

FEEDING

- High energy feeds include shelled corn, wheat, sorghum grains, barley, oats. Crushing or grinding these will aid digestibility. Molasses and animal fats and oils can be used.
- Protein feeds include soy beans (cooked or heat processed), soybean meal, sunflower seed meal, cottonseed meal, fish meal, meat and blood meal, and other by-products from vegetable, meat and milk processing such as buttermilk or whey.
- Vitamins: Most poultry diets containing a variety of these listed feeds will have sufficient vitamins. Green grasses are an especially good vitamin source. Vitamin supplements may be purchased and added to the diet if necessary.
- Minerals are usually added to the above listed feeds. They should contain salt and sources of calcium and phosphorus and trace minerals. Examples are fish meal, steamed bone meal, ground limestone or oyster shells. Packages of balanced mineral supplements can be purchased.

Small stones or grit should be fed as an aid to digestion if they are not present in the environment.

- Clean water must be available at all times.
- A balanced diet using a number of ingredients can be formulated by a trained person using formulas or computer programs designed for this purpose.

HEALTH MANAGEMENT

- Baby chicks should originate from a hatchery that is free of disease problems and that uses hatching eggs from disease free birds.
- Chickens should not have contact with wild birds, rodents and other animals which may spread diseases to them.
- Diseases can be spread between flocks on the shoes and clothing of people, on vehicles and equipment traveling between farms.
- The housing facilities for new chicks should be cleaned and disinfected before the chicks are put into it. Between groups of chickens it is best to keep the housing empty and dry for as long as possible after being cleaned and disinfected.
- Litter material (bedding) should be placed on the pen floor before the chicks arrive. This can be ground corn cobs or straw or other materials that are clean and dry. If the bedding gets wet it must be removed.
- Egg-laying chickens require 15 hours of light each day. Electric lights may be needed. Starting at about the age of 20-22 weeks one hour of light can be added each day until reaching 15 hours.

DISEASES

- Some diseases can be prevented by vaccination, such as Fowl Pox, Infectious Bronchitis, Newcastle Disease, and Marek's Disease. Some of these vaccines must be administered at the hatchery and others can be given in the drinking water.
- Determine what diseases are common in your area and vaccinate accordingly.
- When birds appear sick an accurate diagnosis of the illness should be made so the appropriate treatment can be used. Consulting a specialist is helpful. Dead birds need to be examined in order to determine the cause.
- Disposing of dead birds by burying or burning is important so that diseases are not spread further.

RAISING HEALTHY PIGS



ENVIRONMENT

- Pigs are more vulnerable to extreme temperatures than other animals. They need protection from very hot and very cold and wet weather.
- The ideal temperature range for adult pigs is 10°- 27° C; for baby pigs it is 27°- 34° C for their first 3 to 4 weeks of life.
- Young pigs that are too cold will use most of the food they eat to maintain body heat and will not grow well.

FEEDING: Pigs can be fed both plant and animal origin feeds.

- **Grains:** corn, oats, wheat, barley, triticale, sorghum grain, bi-products from milling grain such as wheat bran. All grains should be ground or cracked or soaked in water to make them more digestible.
- Grain substitutes can replace part but not all of the grains: grasses and alfalfa, potatoes (remove sprouts and don't feed if skins are green), yams or sweet potatoes, root crops (beets, turnips, carrots), apples and other fruits and vegetables, molasses, residue of food processing procedures such as beet pulp, bakery waste. Slaughter house waste can be fed but must be cooked first.
- Do not feed any of these if they are moldy or rotten. Large pieces of fruit and vegetables should be chopped into smaller pieces to prevent choking.
- Protein feeds, plant sources: soybean meal, sunflower seed meal, linseed meal, cottonseed meal, peanut meal, canola (rapeseed) meal, safflower meal, other edible beans, field peas, alfalfa (fresh or as chopped hay).
- Protein feeds, animal sources: meat and bone scraps (cooked), meat meal, blood meal, fish meal, cooked fish and fish scraps, whey (cheese making by-product).
- Vitamins and Minerals: A diet with a variety of the above feeds should contain enough vitamins. Minerals needed are: salt, calcium, phosphorous, and trace minerals. These can be fed free choice in a box or container available to the pigs daily. They can also be mixed in other feeds. Packages of mineral mixes are available to purchase.

BALANCING THE DIET

- The proper combination of the above feeds can be mixed together to make a ration balanced for carbohydrates, proteins, vitamins and minerals. Charts and formulas are available to help do this, but as a general rule the ration should contain 75-80% of the ingredients from the list of grains or grain substitutes and 20-25% from the list of protein feeds. The minerals can be added to the mix or fed free choice.
- Changes from one type of feed to another should be made slowly to avoid digestive problems.
- Pregnant and nursing sows require increased amounts of feed. Animals that are too fat or too thin will be less healthy, produce fewer baby pigs and will not have a good milk supply. It is important to watch the body condition closely to see if the pigs are getting enough to eat. There should be enough flesh covering the bones that they do not protrude. Deep depressions between the rib bones should not be seen or felt.
- Baby pigs start to eat grain when they are 2-3 weeks old. Adding milk to the feed will encourage eating. They should be fed in an area that the sows cannot reach.

MANAGING SOWS AND BABY PIGS

- If a sow needs help delivering a baby pig, before examining and assisting the sow, wash your hands and arms and the vaginal area of the sow well with hot water and soap. Lubricate your arm (or plastic glove and sleeve if available) with soapy water or other lubricant. If necessary, pull the baby pig gently to deliver it.
- Clean and dry the newborn pig. Dip navel cord in iodine or other disinfectant. Keep baby pig warm. Encourage nursing as soon as possible.
- It is common to clip the needle teeth (4 in upper jaw and 4 in lower jaw) to prevent injury to the sow's teats and fighting injuries among the pigs. However, some pig growers do not do this.
- Iron injections should be given to the baby pigs when they are 2-3 days old.
- Castration should be done when the pigs are still nursing so they will be less stressed. The operator's hands and the equipment should be kept clean and the scrotal area of the pig cleaned and disinfected before castration.
- Wean baby pigs when they are eating solid food well. Usually at about 5 to 8 weeks.

DISEASE AND WORM CONTROL

- Manure, mud, wetlands and dirty bedding usually contain disease causing bacteria and worm eggs.
- Keep animal pens clean and well bedded with clean material. When animals are removed from a pen it is helpful to clean it well, disinfect it and keep it empty for several weeks or more to dry out and kill disease causing material.
- Taking animals off pastures and allowing grass to regrow for 3-6 weeks will help break disease and worm cycles.
- Use the cleanest areas for birthing and raising the young.
- Provide clean drinking water at all times, close to the feed source. Keep manure and urine out of water.
- Place feed in containers, not on the ground.
- Separate sick animals from healthy ones.
- Burn or bury dead animals.
- Mange, a skin disease caused by tiny mites, can cause severe itching, crusting and scaling of the skin and poor weight gain. Various products are available to treat it.

WORM TREATMENT SCHEDULES

- Deworm pregnant sows two weeks before birthing with a medication approved for pregnant sows. Repeat 4 weeks later.
- Deworm baby pigs a few days after weaning. Repeat 4 weeks later.
- Deworm boars at least twice a year.
- Pig tapeworms can infect humans and dogs if they eat raw or improperly cooked pork or food contaminated with dog feces.
- The human disease Trichinosis is caused by a tiny worm found in the muscles of pigs, rats and other wild animals. As with tapeworms, it is contacted by eating raw or improperly cooked pork or meat of certain wild animals. Never eat uncooked pork and do not feed it to pigs.

RAISING HEALTHY SHEEP AND GOATS



FEEDING

- Forages (Roughages) are the most important part of the diet of sheep, goats and cattle because of the nature of their stomach. These include: grass, hay, straw, sugar beet pulp, green tops of beets, carrots, and turnips, cabbage leaves, corn and grain stalks, residue remaining after processing of vegetables and fruits. These can make up the complete diet if the quality of the feeds is good, but for young animals that are growing rapidly, pregnant and milking females, additional feeds may be needed.
- Pastures can become overgrazed. Rotating grazing areas by moving animals to new areas when the forage is minimal will permit regrowth to occur will also help parasite control.
- High energy feeds include grains such as sunflower

seed meal, shelled corn, wheat, young green grasses and alfalfa, root crops. Grains should be ground to increase digestibility.

- High protein feeds are important for growth of young animals and for pregnant and nursing females. These include grasses, alfalfa, and grains as well as peas, sunflower seed meal, soybean meal, and meals prepared from animal byproducts.
- Vitamin and mineral supplements may be used when other feeds are deficient in them.
- Providing clean water is essential. Water containers should be scrubbed clean regularly.
- In cold weather increased feed intake is needed to maintain weight and health. This is especially important for young animals.

BREEDING AGE FEMALES

- From 14 days before breeding until 14 days after breeding the energy content of the diet should be increased to improve conception rate and increase the number and health of newborns. Especially if forages are poor, about 0.25 kg of grain should be fed daily. Grains should always be fed by starting with small amounts and gradually increasing over several days to prevent digestion problems.
- At 100 to 150 days of pregnancy the pregnant female requires more energy and protein in the diet for the rapidly growing fetus. If twins are being carried, twice as much is needed as for a single fetus. Straw and poor fodder should not be fed at this time.
- Nursing and milking females have the highest requirement for good energy and protein feeds. High quality pasture is best. Legume hay and up to one kg. ground grain per day may be fed.

LAMBS AND KIDS need milk for first 6-8 weeks of life

• When lambs and kids are 8-12 weeks old they can be weaned and will do well on good quality pasture. If pasture is poor they may need to be fed any of the higher energy and protein feeds listed above if they are introduced slowly, gradually increasing the amounts.

CHECKING NUTRITIONAL STATUS OF ANIMALS

• By looking at their body condition will help determine if their needs are being met. With your fingers reach through the wool and feel the tops of the bones in the spine, and rub your finger tips over the ribs. There should be enough flesh covering the bones that you can't feel deep ridges between them and they should not be protruding. Animals that are too thin or too fat will be less healthy and will have poor reproduction.

HEALTH MANAGEMENT PROCEDURES

- Keep a record of breeding dates so you can feed accordingly and anticipate birthing time.
- Provide a clean, dry and protected place for giving birth.
- The mother may need help with delivery if :

In labor 2 or more hours without progress.

The water bag has broken and no progress in 1 hour.

The mother is straining 30 minutes without sign of fetus.

The fetus is in an abnormal position.

Before help is given, first wash the vaginal area of the mother and your hands and arms with hot water and soap. Keep hands and arms wet with soapy water and examine the reproductive tract and give help as needed. If you can't determine the problem, seek experienced or trained help. If you must pull the fetus be gentle: don't pull if mother is not straining. Clear nostrils of newborn and if necessary, stimulate breathing by blowing into nostrils.

- Dip navel cord of newborn in strong tincture of iodine or chlorine bleach diluted 1 part bleach to 40 parts water. Make sure baby gets dried off and is warm.
- It is essential for newborn to get first milk (colostrum) within an hour or less after birth. If necessary, assist the baby to nurse. Keep it dry and warm. Keep mother's udder clean, clip wool if needed. Strip some milk from each teat to remove plug and check for mastitis.

SCHEDULE FOR HEALTH PROCEDURES

Breeding females and males

• 4 weeks before breeding: deworm, vaccinate with Clostridium C&D and Tetanus toxoid. Repeat vaccinations in two weeks if this was first time vaccinated.

Breeding females

- 2-4 weeks before due date: deworm; revaccinate with Clostridium C&D and Tetanus toxoid.
- 2 weeks after birthing: deworm

Newborns

- 2 weeks old or less: castrate and dock tails. Inject tetanus antitoxin if mother not vaccinated for tetanus.
- 4 weeks old: deworm.
- 8 weeks old: deworm; vaccinate with Clostridium C&D and Tetanus toxoid.

If coccidiosis is a problem start coccidiostat.

- 12 weeks old: deworm; inject second dose Clostridium C&D and Tetanus toxoid.
- Vaccinations for other diseases may be needed depending on diseases present in the area.
- Deworming schedules may vary depending on severity. Check body condition as described above, and color of eye membranes to determine anemia and need for further worming. If possible have fecal samples checked for parasite eggs to help determine need for deworming. Don't keep females for breeding if their mothers need frequent deworming or are doing poorly.
- Do not use the same medication for successive treatments, but alternate them.
- If possible put animals on new pasture after deworming and rest the old pasture for 2-3 weeks before re-pasturing.
- To avoid parasite egg ingestion. don't place feed on ground or where it has fecal contact.

RAISING HEALTHY CROPS



SOILS

- Most crops need a soil pH of 6-7. If you suspect that the soil is too low in pH, add lime, eggshells, or other calcium sources. The larger the size of the material, the more time it will take to dissolve and raise the soil pH; therefore, fall/ winter application is best. If the soil pH is too high, applying sulfur will lower the pH.
- Major nutrient needs/crop (written below as per hectare or measure of expected yield).

CropNitrogen (N)Phosphorus (P2O5)Potassium (K2O)Corn17.72 kg/tonne7 kg/tonne5.5 kg/tonneSoybeans18.5 kg/ha. with seed16.5 kg/tonne23.5 kg/tonneSunflowers40 kg/tonne15.4 kg/tonne20 kg/tonneSweet Corn140-168 kg/hectare177 kg/hectare177 kg/hectareAnimal mar

Sweet Corn 140-168 kg/hectare 177 kg/hectare 177 kg/hectareAnimal manure is rich in nitrogen, phosphorus and potassium. Ammonium sulfate has a 21-0-0 (21 lbs N/100 lbs material); 10-10-10 and 16-16-16 are also sources of nitrogen, phosphorus and potassium. Straw or fodder are potassium sources. Spread manures in the fall, winter or spring before planting. Apply ammonium sulfate before planting; apply 10-10-10 or 16-16-16 with the seed during planting, but only at low rates, as high salt fertilizers can burn the fragile seedling.

Soil structure is very important. If soils are sandy, leaving crop stalks and/or adding organic matter (leaves, animal manure) will increase the water-holding ability of the soil. If soils have heavy clay, growing deep-rooted crops will leave holes through which water can travel after the roots have decomposed. Corn, grasses and small grains produce lots of residue and fine roots and are good for building organic matter. Sunflowers and alfalfa have deep root systems. No-till planting procedures maintain these natural root channels, improve soil structure and allow water to pass through the soil instead of making a puddle.

• Do not work the soil when conditions are too wet. If there is potential to create lots of ruts and compact the soil, it is best to either wait to plant the crop or to minimize travel and weight over the soil (keep loads under 9 Tonnes/axle, tire pressure under 241 kPa). Building the organic matter of your soil will also improve the soil's ability to withstand and rebound from compaction.

PLANTING

- To test germination of your seed, put seeds in a row between two moistened newspapers, roll into a tube shape and place in a plastic bag. Put in a warm (24 C) place. Make sure the papers stay moist, and check every other day for up to 7 days. Count the number of seeds that have germinated and adjust planting populations. Check for insect-damaged, nicked seed, or possible disease on the seed.
- Control weeds before or just after planting. Herbicides or cultural weed control should occur before the crop emerges from the ground. The weeds will compete for water, nutrients and sunlight. In soybeans, for every inch of weed growth, you will lose 47 kg./ha. of yield. In corn, when weeds reach 10 cm. in height, you can lose 188 kg. of yield/ha. for every day that you delay weed control.
- If soil conditions are moist, treat the seed with fungicide before planting. If seed or seedling worms are often a problem, treat the seed with an insecticide.
- Suggested planting factors:

CornSoybeansSunflowerSweet CornPopulation50,000/ha.150,000/ha.35,000/ha.40,000/ha.

Planting Depth 6-10 cm. deep 4-7.5 cm. deep 5-7.5 cm. deep 6-10 cm. deep. Check the temperature of the ground before planting by pushing a thermometer into the soil to the depth you would place the seed. Temperatures should be at least 10 C for corn/sweet corn and sunflowers; 13-16 C for soybeans.

• Make sure that your planter is working well before you begin to plant; firming the soil over the planted seed will keep the seed from drying out and maintain good seed-soil contact. This allows the fragile seedling root to obtain water and nutrients as soon as the seed germinates. Sunflowers especially need consistent moisture for the best germination.

WHILE THE CROP IS GROWING

- Take time to walk through your crop and look for problems. If you know what happened this year, you may be able to prevent it next year. If you see worms or diseases that affect more than a quarter of the plants, spray a pesticide.
- Count the number of plants in a known area and calculate the planting populations vs. actual plants to see if you had germination or planting problems.
- Check crops for nutrient deficiencies. If the plant is light green, plant growth is stunted. If lower leaves are yellowing from the leaf tip in a V-shape toward the leaf base, nitrogen is limited. If leaf stems and stalks are purple, fruit is small, and crop maturity is delayed, phosphorus is limited. If the lower leaf edges are yellow/brown and stalks are weak, potassium is limited. If the lower leaves have white/yellow stripes between the veins (corn) and/or are mottled yellow (soybeans/sunflowers), there may be a magnesium deficiency. If upper leaves are yellow/white, this is a micronutrient deficiency.
- •. Weeds need to be managed. A second spraying with herbicide is a good option if there are a lot of weeds. If you have a herbicide to use during the season, spray when emerged weeds are still under 10 cm.

GARDENS

• Rotate crops to different places in your garden each year. Wait 4-5 years before planting a crop or related crops in the same spot again. This will help to minimize diseases.

- Review the soil section for fields for tips on improving your soil. Adding manure, leaves, vegetable peels and cores to your garden will help build organic matter and provide nutrients. Worms and soil microbes will help break these down and make rich, nutritious soil for vigorous crops!
- To grow transplants, sow seeds indoors in containers. Tomatoes/peppers (2 months), onions (1 month). Plant the seeds 1 cm. deep in moist soil. Put the containers in a plastic bag and set in a sunny, warm spot. When the seedlings are emerged from the soil, you can remove the containers from the bags, but be sure to keep the soil fairly moist (mist the seedlings every day or two).
- •. In the garden, plant little seeds on the surface of the ground and sprinkle soil over them (0.5-1 cm. deep). Larger seeds can be planted deeper. Corn and beans can be planted at 4-6 cm. deep.
- Mulch your garden with leaves, and shredded old newspapers to keep weeds controlled and to keep the soil from drying out during the growing season. Water your garden if you are not receiving rain at least once every week. Pull weeds before they get to be 8 cm. tall.
- Remove diseased plants or fruit as soon as you see them. This will keep disease from increasing in your garden during the current and following growing seasons. Also look for insects and kill the bad bugs as soon as you see them.
- If you save seeds, keep them in paper envelopes in a cool, dry area.





















Шаги к успешному переходу на No-Till



Сьёрд Дуикер специалист по управлению почвы; Penn State

Джоэл Майерс Департамент Сельского Хозяйства США

