

# AGRABILITY QUARTERLY

Promoting Success in Agriculture for People with Disabilities and Their Families

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The National  
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University of  
Wisconsin-Extension  
Cooperative Extension

Easter Seals

## Utility Vehicle Extends Pennsylvania Dairy Farmer's Day

Charlie Robinson owns and operates a dairy farm in northwestern Pennsylvania. Since 1982 he has had lower back pain and osteoarthritis of the lumbosacral spine, making it difficult for him to complete some of his farm tasks. AgrAbility for Pennsylvanians staff began working with him in 1998. Together, Robinson, his family, and the AgrAbility staff, including a subcontracted physical therapist, determined the type and level of assistance he needed. The state office of vocational rehabilitation (OVR) was then contacted for assistance.

Robinson's primary issue was mobility. AgrAbility staff recommended three major changes/additions to his operation. First, a [John Deere Gator](#) with a dump bed was purchased. Cold weather seriously affected Robinson's abilities in the winter months, so a Curtis Cab and heater were added to the Gator.

Second, the stall barn was modified by removing the old stanchions and installing new tie-type stanchions and by raising the height of the deck where the cows stand by four inches. This height change makes it easier for him to use a milking stool that takes 90% of the strain off his lower back when doing the daily milking.



Robinson's John Deere Gator, complete with dump bed, Curtis Cab, and heater, provides him mobility on the farm.

Third, his Massey Ferguson 1100 tractor was modified to include a rollover protective structure (ROPS), additional tractor steps and grab bars, and a [Grammer seat](#). OVR provided full funding for the Gator, the barn modifications, and the tractor ROPS.

Robinson says, "I felt better at the end of the first day with the modifications. The new seat made a huge difference. I am now able to work many more hours without pain. In fact, I do most of the work now by myself."

Article and photograph were provided by [AgrAbility for Pennsylvanians](#).

## Facts about Arthritis

Arthritis and related musculoskeletal conditions are the leading cause of disability in the United States today. In fact, arthritis is the most common reason adults between the ages 40 and 75 give for limitations in their physical activities and restrictions in their activities of daily life.

Arthritis is a potentially disabling condition for anyone with one of the many forms of this disease, but its impact on people living in rural communities is often even more severe than on those in urban settings. Because of the physical nature of farm/ranch work and activities of daily life in the agricultural environment, people with arthritis face major challenges both on the job and at home.

### Definition of Arthritis

Arthritis is a disorder of the joints that connect the bones of the body. The name arthritis means joint inflammation or swelling. Joints are located wherever two or more bones meet. Cartilage and a lubricating fluid form a smooth gliding surface for the bones of the joint. Ligaments hold the joints together.

When joints become injured or diseased, they swell. Inflammation is a normal part of the body's defense system. It is a natural reaction to injury and it causes swelling, pain, and redness. Decreased motion in the affected area results.

With arthritis, inflammation becomes part of the problem. It causes tissue damage that the body tries to handle by creating more inflammation. This painful cycle of destruction changes the bones and other joint tissues and limits their function.

### Types of Arthritis

Over 100 types of arthritis affect the joints and connective tissues of the body. Each type of arthritis has different symptoms and patterns and each requires different treatments. Arthritis comprises a variety of diseases and conditions, including osteoarthritis, rheumatoid arthritis, fibromyalgia, lupus, childhood arthritis, gout, bursitis, Lyme arthritis, and carpal tunnel syndrome.

### Cause Unknown

The cause(s) of arthritis is unknown, however, clues to its origin are being uncovered. Researchers are currently studying the role that genetics, lifestyle, and significant lifetime events play in certain types of arthritis. Some evidence shows that people with particular gene types are prone to specific forms of arthritis. Also, certain infections seem to trigger the onset of arthritis.

## Arthritis Statistics

Arthritis Statistics for the United States as reported on the [Centers for Disease Control \(CDC\) website](#).

- ✓ Arthritis is the leading cause of chronic disability<sup>1</sup>.
- ✓ Almost 43 million Americans—one in six people—have some type of arthritis<sup>2</sup>.
- ✓ Arthritis affects people of all ages.
- ✓ An estimated 60 million people will have arthritis by 2002<sup>2</sup>.
- ✓ More older than younger, more rural than urban, and more poorly educated/low-income than highly educated/high-income individuals have arthritis<sup>2</sup>.
- ✓ Prevalence of arthritis increases after age 45<sup>2</sup>.
- ✓ Two-thirds of all Americans with arthritis are women—that is 23 million women<sup>2</sup>.
- ✓ Juvenile arthritis affects about 285,000 children.
- ✓ Rates of arthritis are 15.2% among whites, 15.5% among blacks, 7.3% among Asian/Pacific Islanders, and 11.3% among Hispanics<sup>2</sup>.
- ✓ Rates of arthritis among people in the northeast and western regions of the U.S. are lower than those among other regions<sup>2</sup>.

**Focus**

**Arthritis**

**Warning Signs**

Consult a doctor if any of these symptoms in or around a joint lasts for more than two weeks.

1. Swelling in one or more joints.
2. Stiffness around a joint that lasts for at least 1 hour in the early morning.
3. Constant or recurring pain or tenderness in a joint.
4. Difficulty using or moving a joint normally.
5. Warmth and redness in a joint.

Some forms of arthritis go through cycles of getting better and worse. A flare-up means the disease is more active. During this time, a person experiences increased morning stiffness, pain and swelling in the joints, tiredness and fatigue, and involvement of new joints. Flare-ups can occur after eating a specific food. Milk is the most common offender. Other foods that have been known to cause flare-ups are shrimp, wheat products, and certain meats.

**This information is provided for educational purposes only. You should consult a qualified health care provider if you have a question about your particular medical condition.**

**Treatment**

For a person with arthritis, early diagnosis and regular review of the treatment options with a doctor are important. The doctor should be notified if a treatment plan is not working.

Treatment for most forms of arthritis falls in at least one of these categories:

- ◆ medication,
- ◆ exercise,
- ◆ application of heat or cold to joints,
- ◆ pacing/rest,
- ◆ protecting joints from stress,
- ◆ assistive devices,
- ◆ self-help skills like mental/biofeedback exercises, and
- ◆ surgery.

Although some people have reported that massage, diet, and acupuncture has lessened or alleviated pain, and reduced symptoms, scientific studies have not yet confirmed a clear role for these modes of treatment. Glucosamine and chondroitin sulfate, two nutritional supplements, have received a good deal of press over the past few years regarding their ability to reduce symptoms of osteoarthritis.

**The team captain**

Although a treatment plan for a specific person with arthritis may involve a team of health care professionals, the person with arthritis should be the team captain. Since each type of arthritis has different symptoms and treatments, the person with arthritis should take an active role in seeking

information, working with health care professionals, and sharing in the decision-making responsibilities.

According to the staff at the [Missouri Arthritis Rehabilitation Research and Training Center \(MARRTC\)](#), research has shown that individuals who play an active role in their health care plan report less pain, make fewer doctor visits, and enjoy a better quality of life.

**For more information, contact:**

[National Institute of Arthritis and Musculoskeletal and Skin Diseases \(NIAMS\) Information Clearinghouse](#)  
 1 AMS Circle  
 Bethesda, MD 20892-3675  
 877-226-4267 (toll-free)  
<http://www.niams.nih.gov>

[Arthritis Foundation & American Juvenile Arthritis Organization](#)  
 1330 West Peachtree Street  
 Atlanta, GA 30309  
 800-283-7800 (toll-free)  
<http://www.arthritis.org>

[American College of Rheumatology](#)  
 1800 Century Place  
 Suite 250  
 Atlanta, GA 30345  
 404-633-3777 (voice)  
<http://www.rheumatology.org/index.asp>

## Farming & Ranching Made Easier

The nature of arthritis is such that the farmer/rancher with it can experience daily variations in levels of joint pain and mobility, which in turn affect his or her ability to complete essential work tasks. Farmers/ranchers with arthritis should work in environments consistent with their functional abilities and production levels. They need to attend to the limitations caused by their disability, including taking frequent breaks, and, as much as possible, conserving their energy and letting assistive technology help them do the work. A variety of assistive technology solutions can make farm/ranch work easier.

### Tools and Equipment

The Missouri Farmer with Arthritis Project (see pages 6-7) provides these recommendations to consider for tool and equipment modifications made to reduce joint stress, pain and fatigue. The goal is to allow the farmer to complete a task with the least amount of effort.

#### 1. Use wheels

- ♦ To reduce friction, lessening the resistance between surfaces. Consider larger diameter wheels which have less rolling resistance.
- ♦ To avoid lifting and carrying a load

#### 2. Use extended handles

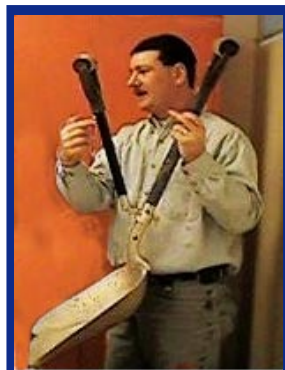
- ♦ To use less force to manipulate objects and help to conserve energy.

#### 3. Use lightweight objects

- ♦ To reduce joint stress, pain, and fatigue.

#### 4. Use large handles

- ♦ To help maintain a secure hold when hands are weak.
- ♦ To help hold an object if fingers do not fully close.
- ♦ To lessen tension required to maintain your hold on objects.



This individual points out an example of an extended handle on a lightweight shovel.

### Tool Design

Another alternative to modifying tools is selecting tools with designs that reduce joint stress. Some examples are:

- ♦ Automatic tools, such as an inline power screwdriver, can eliminate the need for repetitive wrist twisting.
- ♦ Spring-loaded or self-adjusting tools with ergonomic handles can reduce pressure and pain to joints.
- ♦ Ratcheting wrenches, PVC cutters, and pruning shears increase leverage and force with minimal pressure.

### Anti-vibration Material/Aids

- ♦ Shoes made with shock absorbing materials, such as Sorbothane, can reduce secondary injuries to joints.
- ♦ Anti-vibration gloves can reduce the impact on a farmer's or rancher's hand and finger joints when working with tools.
- ♦ Anti-fatigue mats can be used to pad the floor in a milking parlor or shop for individuals with arthritis in their lower extremities or back.



An example of anti-fatigue mats used in a milking parlor.

## Assistive Technology Notes

## Arthritis

### Tractors and Machinery

For a farmer or rancher with arthritis, the simple task of getting up and into a tractor or combine cab can be painful, very difficult, or sometimes impossible. The addition of a standing or chair lift may be the only viable way for a farmer or rancher with arthritis to gain access to a tractor or combine. Sometimes simple modifications,

such as the addition of a step and hand holds, to the tractor or other self-propelled machinery allow the operator to access the seat

For further assistive technology information, check out the National AgrAbility web site at <http://www.agrabilityproject.org>. If you have a specific question, use "Contact Us" to send an e-mail message.

with reduced stress on their joints. Ergonomic hand controls may need to be installed if a farmer or rancher is unable to use his or her feet to operate the equipment with the standard floor-mounted controls. Remember, arthritic hands and feet need extra protection in colder climates. Therefore, tractor, truck, and combine cabs should be equipped with working heaters.

### Utility Vehicle

A utility vehicle (UV) can be used to improve the mobility of a farmer or rancher with arthritis. UVs are great for transporting feed, tools or other equipment. Using the UV to haul items rather than manually carrying the items reduces the stress on the farmer's or rancher's hands, wrists, shoulders, hips, knees, and back. Commercially available UVs include the [John Deere Gator](#), the [Kawasaki Mule](#), and the [Polaris Ranger](#). However, a new or used golf cart might serve this function well. An individual's abilities and work site requirements are crucial factors to consider when determining whether a UV is an appropriate choice. Before purchasing a UV, the farmer or rancher should try out the vehicle to be certain that it is accessible, easily operable, and places no added pressure on joints or other parts of his or her body.

### Livestock Feeding and Care

Automated feeding equipment (e.g., motorized feed carts, bulk feeding systems) can be used to reduce the manual labor involved with feeding livestock. Using other attachments on existing equipment, such as a skid steer loader equipped with a bale prong to place large hay bales in feeding areas, is another way to lessen the manual effort. Moving bales in this way means the farmer or rancher with arthritis need not repeatedly handle small bales of hay for feeding livestock.

A farmer or rancher with arthritis needs to take added precautions to avoid unnecessary contact with the livestock while caring for them to limit further injury or prevent possible secondary injuries. Different types of assistive technology modifications are available, and their implementation depends on the type of livestock production, facilities, equipment and management needs. For example, based on need, modifications could be as simple as adding gates to the livestock working area. Setting up a series of gates or a squeeze chute can reduce the direct contact with livestock and reduce the risk of injury while sorting, treating or shipping animals. For dairy operations, a farmer with arthritis may find it helpful if he or she can reduce the number of times needed to stoop or reach under the cow during the milking operation. In this case, changing to automated milking unit detachers in their stanchion barns would be beneficial. In other situations, for a farmer with more severe arthritis, perhaps changing from a stanchion barn to a milking parlor should be considered to reduce stress on the arthritic joints resulting from stooping and reaching during milking.

Other uses of simple assistive technologies might include the addition of drive through electric or automatic-opening gates at the entrance to livestock areas. Automatic-opening and -closing gates can greatly reduce the number of times a farmer or rancher with arthritis needs to mount and dismount a tractor or other vehicle. Automatic hitching systems allow the farmer or rancher with arthritis to remain in a pick-up truck or tractor seat while hitching or unhitching equipment on level surfaces.

## Partnership is Key to Missouri AgrAbility Project

The [Missouri AgrAbility Project \(MAP\)](#) is a partnership between Agricultural Engineering Extension at the University of Missouri-Columbia, the Small Farm Family Program at Lincoln University Cooperative Extension, and Services for Independent Living in Columbia, Missouri. The MAP offers comprehensive assistance to individuals and their families engaged in farming or a farm-related activity who have been affected by a disability. Building on the strength of nationwide informational resources, along with a statewide network of rural health, safety, rehabilitation, and social service agencies, the Missouri AgrAbility Project offers individualized services aimed at increasing self-sufficiency and independence.

### The Master Link

With the Missouri AgrAbility Project in the role of a “master link,” the program is directly connected to a network of service providers, product suppliers, and product manufacturers in order to provide education, information, or support to the extent desired by the individual or the family. Types of assistance include on-site assessments to determine adaptive requirements, equipment and work site modification consultation, job task analysis, agricultural occupation alternatives, farmer-to-farmer networking, educational and awareness training, and safety and prevention of secondary injury awareness.

The [Arthritis and AgrAbility: Dissemination and Technology Transfer to Rural Communities](#) at the [University of Missouri-Columbia](#) works to meet the needs of persons with arthritis-related disabilities in rural and agricultural communities. Missouri farmers are eligible if they have been clinically diagnosed with some form of arthritis. Farmers are provided an on-the-farm assessment, worksite evaluation, and suggested interventions. The program staff suggests home and equipment modifications or adaptations, techniques for proper body mechanics, and specific types of tool usage to prevent pain and further injury as a result of this disease.

### A Client’s Story

William Wetherell assists part time on the family livestock and grain operation. He contacted the [Missouri Arthritis Rehabilitation Research and Training Center \(MARRTC\)](#) to

request help through the [Arthritis and AgrAbility: Dissemination and Technology Transfer to Rural Communities Program](#) because he was having problems with pain and fatigue due to his osteoarthritis.

*“I was surprised that simple modifications combined with small changes in daily routines and habits could result in so much improvement in comfort for me while I am operating these tractors.”*

*William Wetherell  
Client, Missouri AgrAbility Project*

Wetherell experienced pain in his back, shoulders, and neck

when twisting and reaching to shut off the PTO and in his knees when mounting his old tractor. He also experienced pain and fatigue in his knee and back as a result of his improper positioning in the seat of his newer tractor.

The MARRTC staff suggested ways he could mount his tractor that would cause him less pain; installed a metal grate on the steps and platform of the tractor to provide better traction; fabricated a longer handle for the PTO lever so it would reach the right side of the tractor seat; and showed him how to use proper body mechanics when shoveling. They also suggested starting an exercise routine to help reduce his pain and fatigue.

As a result of assistance from MARRTC, Wetherell has been able to significantly reduce the level of discomfort he experiences when using his Farmall 300 and IHC 766 tractors.

## Meet the Missouri AgrAbility Project Team



**Willard Downs**, Ph.D., is a Professor and Program Leader for [Agricultural Engineering Extension](#) and [Agricultural Systems Management](#) at the [University of Missouri-Columbia](#). As the MAP Principal Investigator, he has directed the project since its inception in 1994.



**Karen Funkenbusch**, MA, Research Associate for [Agricultural Engineering Extension](#) and the [Department of Physical Therapy](#) at the [University of Missouri-Columbia](#) serves as the campus-based [Missouri AgrAbility Project](#) Director. Funkenbusch has worked for

seven years with the Missouri AgrAbility Project. Her work with the [Gardens for Every Body](#) program as well as ergonomic, enabling, and adapted garden tools and equipment for accessible gardening is well known and respected throughout the state. Her background in Guidance and Counseling with an emphasis in Personnel Administration and Mental Health Counseling has benefited Missouri farmers and ranchers.



**Sandra Zaring** serves as the MAP Administrative Assistant and provides support to Dr. Downs, Dr. Paul, and Mark Stone on finalizing reports, approving budget expenditures, and preparing financial reports. She also facilitates the toll-free information line, disseminates

requested information, and arranges presentations at organizations, conferences, and agencies that have an interest in serving farmers and ranchers with disabilities. Zaring has worked with the Missouri AgrAbility Project for seven years.



**Brad Marsh**, ATP, [Services for Independent Living](#), is the Missouri AgrAbility Coordinator. As the case manager for many of the MAP clients, he completes tasks that include conducting work site assessments, searches out potential resources to supply needed equipment

and assistive technology, and recommends solutions to problems of accessibility on the farmstead. He annually participates in training on adaptive technologies, home modification, advocacy, and community services. Marsh has been with the Missouri AgrAbility Project since its inception in 1994. During 2000, Marsh attained [Rehabilitation Engineering and Assistive Technology Society of North America \(RESNA\)](#), certification as an [Assistive Technology Practitioner \(ATP\)](#).



**K.B. Paul**, Ph.D., [Lincoln University](#), Professor of Agriculture & Natural Resources, State Extension Specialist, and Leader of the Missouri Small Farm Family Program, serves as the lead administrator for the LU campus AgrAbility Project.

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**References and Resources**

**Arthritis**

<sup>1</sup>CDC: Prevalence of disabilities and associated health conditions among adults—United States, 1999. *Morbidity and Mortality Weekly Reports* 2001; 50: 120-5. ([Targeting Arthritis: The Nation’s Leading Cause of Disability, At A Glance](#))

<sup>2</sup>Helmick, C.G., Lawrence, R.C., Pollard, R.A., Lloyd, E., & Heyse, S. Arthritis and other rheumatic conditions: who is affected now and who will be affected later? *Arthritis Care and Research*, 1995.

[Scientific Conference on the Prevention of Onset, Progression, and Disability of Osteoarthritis](#) — Bethesda, MD, July 23-24, 1999

Special thanks to Karen Funkenbusch and Brad Marsh, Missouri AgrAbility Project, for contributions to this publication.

The **AgrAbility Project** promotes success in agriculture for individuals with disabilities and their families through on-site assistance and educational resources. For additional information on the [National AgrAbility Project](#) or for a current list of state project sites, addresses and telephone numbers contact:

**University of Wisconsin - Cooperative Extension**  
**460 Henry Mall**  
**Madison, WI 53706**  
**866-259-6280 or 608-262-5166**

**Easter Seals**  
**700 Thirteenth St., NW-Suite200**  
**Washington, DC 20005**  
**800-914-4424 or 202-347-3066**

<http://www.agrabilityproject.org>

**State Projects**

**Colorado** - Colorado State University Extension Service  
 Easter Seals Colorado

**Delaware** - University of Delaware Extension Service  
 Easter Seals Delaware

**Illinois** - University of Illinois Extension Service  
 Easter Seals Central Illinois

**Indiana**- Purdue University Extension Service  
 Southern Indiana Center for Independent Living

**Iowa** - Iowa State University Extension  
 Easter Seals Iowa

**Minnesota** - University of Minnesota Extension Service  
 Goodwill/Easter Seals Minnesota

**Mississippi** - Mississippi State University Extension Service  
 T.K. Martin Center for Technology and Disability

**Missouri** - University of Missouri Extension Service  
 Services for Independent Living

**Nebraska** - University of Nebraska Extension Service  
 Easter Seals Nebraska

**North Carolina** - North Carolina State University  
 Partnership in Assistive Technology

**North Dakota** - North Dakota State University Extension Service  
 Easter Seals North Dakota

**Pennsylvania** - Pennsylvania State University Extension Service  
 Easter Seals Central Pennsylvania

**South Dakota** - South Dakota State University Extension Service  
 Easter Seals South Dakota  
 Avera Health System

**Tennessee** - University of Tennessee Extension Service  
 Easter Seals Tennessee

**Texas** -Texas Agricultural Extension Service  
 Warm Springs Resource Center

**Utah** - Utah State University Extension Service  
 Options for Independent Living

**West Virginia** - West Virginia University Cooperative Extension  
 North West Virginia Center for Independent Living

**Wisconsin** - University of Wisconsin Cooperative Extension  
 Easter Seals Wisconsin

States with affiliate projects are Kentucky, Louisiana, Michigan, Idaho, New Hampshire, New Jersey, New York and Vermont.

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