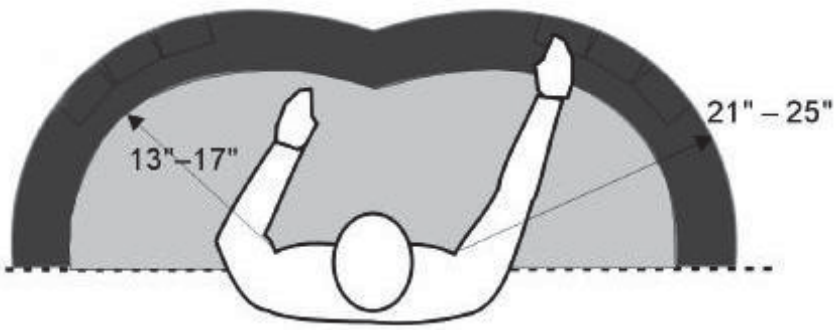
Ergonomics in Agriculture

Although, agriculture has become more mechanized in the last century, there are still many small farm operations where planting and harvesting activities are done by hand-a person's hand. Stooping, bending, lifting, twisting, kneeling, forceful gripping, carrying, vibrating equipment/machinery and long periods of repetitive motion can all lead to musculoskeletal injuries. Musculoskeletal injuries from agricultural work can result in pain in the back, neck and shoulders, as well as other areas of the body. The study of Ergonomics aims to find the best fit between the worker and the work conditions.

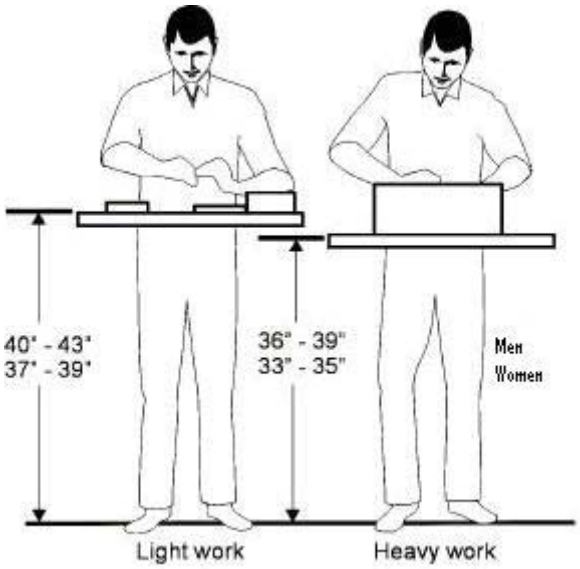
A wide range of ergonomically designed tools are available to make agricultural work more comfortable, including lifting tools, weeding stands, and harvest carts. Some ergonomic solutions simply call for smaller or differently shaped carrying tubs. A well organized and ergonomically designed work station can improve the health and well-being of workers. Performing brief strengthening and stretching exercises can also help prevent injuries. The following guidelines from *Simple Solutions: Ergonomics for Farm Workers* can help create a more comfortable and productive work environment.

Guidelines for Hand Work

- Avoid placing needed tools or other items above shoulder height.
- Position items that are used often within 17 inches of the worker.
- When movements are repeated over and over, as in picking or weeding, allow enough time in between for adequate recovery, by having the worker alternate with a low-repetition task. For example, a worker who performs a high repetition weeding task should be given other tasks that don't require repetitive hand motions, like carrying the finished boxes to the loading area.
- Provide seated jobs. Sitting down while working reduces the strain on the lower back and legs. Standing causes legs to swell (more than walking does). The best jobs are ones that allow workers to do different types of work, changing from sitting to standing to walking and back again.
- Allow foot and knee clearances for both standing and sitting workers, so they can get close to the work.
- Provide floor mats for standing work stations, to reduce fatigue.
- For standing work, use the proper work station height.



Position items that are used often close to the worker.

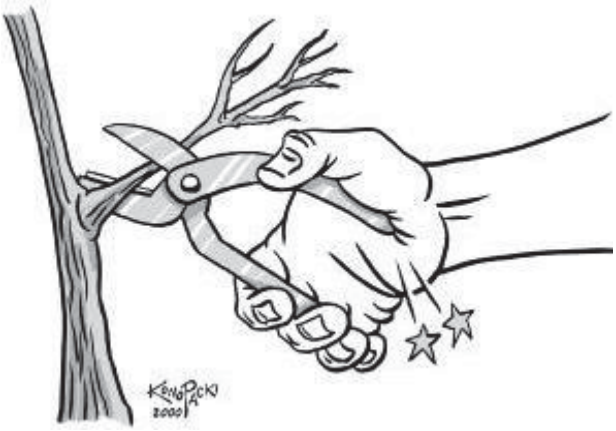


Proper work station height for light and heavy work.

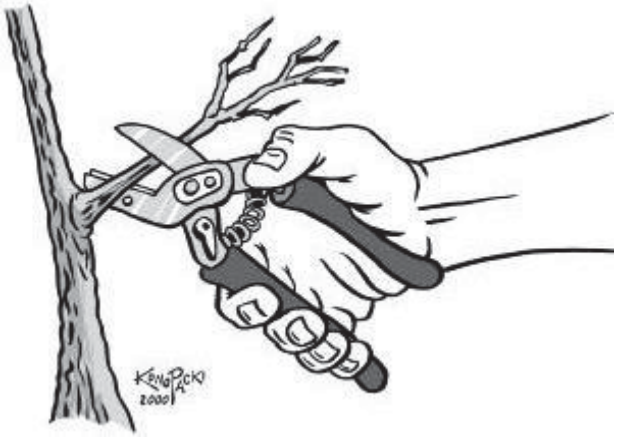
Guidelines for Hand Tools

- When tools require force, handle size should allow the worker to grip all the way around the handle so that the forefinger and thumb overlap by 3/8". Handle diameter should range from 1-3/8" for small hands to 2-1/8" for large hands, with an average of 1-3/4".
- Handles should be covered with smooth, slip-resistant material (plastic or rubber). Dual-handled tools (like shears or pliers) should have a handle length of at least 4" and preferably 5". They should have a spring return to maintain an open position, and handles that are almost straight without finger grooves.

Handle diameter is large enough for small overlap of thumb and fingers.



Poorly-designed tool: Handle presses into base of palm and requires user to open after each cut (no spring).



Well-designed tool: Handles are long. Spring return keeps tool open. Handles are covered with rubber or plastic grip.

Guidelines for Lifting

- Keep lifts between hand level and shoulder level. Avoid lifts from the floor or over shoulder level.
- Provide handles on containers.
- Redesign loads so they can be lifted close to the body.
- Provide dollies, pallet trucks, or utility carts for objects that have to be carried more than a few feet. Provide roller conveyors for bags or boxes of vegetables or chemicals that are handled often. This will reduce the amount of lifting.
- Keep bag or box weight below 50 lbs. Or use the NIOSH Lifting Equation to determine an acceptable weight. See the Resources section for information on the Lifting Equation.

Lifting from a good height, between waist and shoulder level.

Poorly-designed load: No handles, and load must be carried too far from the body.

Better-designed load: Handles are provided and the load is closer to the body.

Guidelines for Stooped Work

- Redesign the job to avoid stooped work:
  - Attach long handles to tools. (For an example, see pages 9-10.)
  - Provide stools. (For an example, see pages 15-16.)
- If stooped work is required, provide employees with other short tasks that require walking or sitting.

Resources:

Simple Solutions for Farm Workers:
http://www.sfc.ucdavis.edu/Pubs/articles/tipsheets.pdf

Agricultural Ergonomics Research Center: http://ag-ergo.ucdavis.edu/

National Center for Farmworker Health Online Resource Library-Ergonomics Results:
http://www.ncfh.org/?plugin=ecomm&content=search-results&searchType=basic&formPage=http%3A%2F%2Fwww.ncfh.org%2F%3Fpid%3D32&search_words=ergonomics