

## WORK STATION DESIGN AND WORK TOOLS

As well as on the farm, farmers and their families are working at in-house workplaces. They have to sort and pack agricultural products, and also do cooking and other family jobs at home. Farmers need appropriate workstations and work tools for these jobs. Well-designed workstations for farmers' work prevent pains on your back, neck, arms and legs, resulting in increased work efficiency. This chapter provides you with practical measures to design the better workstations and work tools for you. The ideas include appropriate working-height, stable chairs and working tables, the measures to avoid strenuous work postures, and tools helpful for reducing your force. These improvements are all possible at low-cost.

**CHECKPOINT 9**

***Adjust the work height so that work is done at elbow level or slightly lower than elbow level.***

**BENEFITS FOR FARMERS**

- Various agricultural jobs such as sorting and packaging farm products need appropriately-designed workstations. Muscle strains and pains could be prevented and efficiency increased. Good workstations can also make house-keeping jobs such as cooking and washing easier.

- A working height at elbow level minimizes your muscular efforts. This rule is applicable for both standing and sitting postures. Adjust the work surface to elbow level or slightly lower than elbow level. Work could be carried out comfortably. Efficiency and productivity of the work will increase remarkably.

- When working at a height lower than elbow level, farmers need to bend their body trunk. This posture poses strains on your back and could cause low back pains. If the work station is higher than elbow level, you have to keep arms and shoulders elevated. It will cause gradual stiffness and pains and farmers will find it difficult to continue their work.

**HOW TO IMPROVE**

1.) Look at your work stations, work tables, and cooking devices at home. Adjust their heights to elbow level.

2.) The height of workstations should be adjusted to the height of the

most frequent users.

3.) One workstation may be used by many farmers together. Use a foot platform for small farmers and an item holder for tall farmers to adjust their work height to elbow level.

4.) When you need to exert greater force such as cutting products and repairing tools, choose work stations slightly lower than your elbow level.

**WAY TO PROMOTE COOPERATION**

Many farmers work on the ground by squatting when sorting and packaging farm products. This posture causes strains and pains. Encourage your friends and neighbours to apply appropriate workstations (chairs and tables) and to adjust the height to elbow level. The same principle can be applied to your family work. Discuss plans with your family members to use appropriate workstations. After changes, evaluate benefits together.

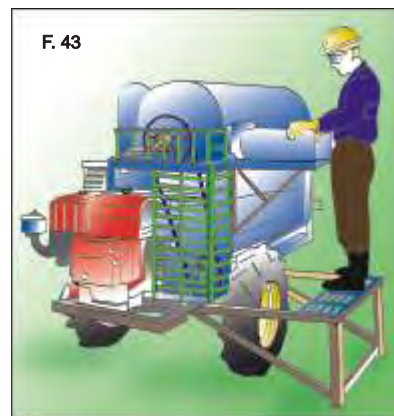
**SOME MORE HINTS**

Some workstations might be shared by several farmers who are of different heights. Design height-adjustable workstations using simple devices.

**POINTS TO REMEMBER**

*Your work will be most efficient when the work height is adjusted at around elbow level.*

*Figure 42, 43: Adjust the work height at around elbow level.*



*Figure 44: Use a foot platform for small farmers in case of the workstation may be used by many farmers together.*

*Figure 45: Change the farming arrangement in the field to avoid as much as possible strenuous working postures.*



*Figure 46 : Adjust the work height by using a stable foot platform corresponding to your elbow level.*



*Figure 47: When need greater force, choose the work station slightly lower than your elbow height.*

**CHECKPOINT 10**

***Provide stable chairs or benches with sturdy backrests.***

**BENEFITS FOR FARMERS**

- Farmers have many jobs which need to be carried out in sitting. Appropriate chairs or benches with sturdy backrests make your work much easier. You can relax your back muscles by leaning against a backrest.

- You may think that a sitting posture is always more comfortable than standing. However sitting for long and successive hours could cause strain and pains on your back. A backrest allows your back muscles to relax from time to time, reduces weariness and increases your job satisfaction.

**HOW TO IMPROVE**

1.) Walk around your village. Find jobs which are being performed in sitting, or would be better if performed in sitting. What kind of chairs do farmers use ?

2.) Attach a sturdy and appropriate backrest to chairs for seated farmers.

3.) Backrests should be attached to benches, too. Wooden or bamboo benches with arm and back supports will help group work such as sorting farm products, picking up seeds, etc.

4.) Adjust the work surface height to an individual's elbow level.

**WAY TO PROMOTE COOPERATION**

Chairs with a backrest do not cost much. You will surely find many good examples in this regard in your village. Learn from existing good examples. How are the chairs with backrest used? How are they made? With what materials? And then promote chairs with a backrest to many other villagers. Start with simple actions using available local materials such as upgrading wobbly chairs, or attaching sturdy backrests. Encourage your neighbours to form a habit of using chairs with a backrest when working in a seated position.

**SOME MORE HINTS**

- Armrests can also be useful for precision jobs which need a sustained arm position.

- Chairs with a backrest might not be best for work which requires frequent body movements. If so, use stools or chairs without a backrest.

- When long periods of sitting are needed, use a cushion or a round pillow behind your lower back. It could reduce the strain on your back.

**POINTS TO REMEMBER**

*Appropriate chairs using sturdy backrests will increase the quality of your work.*



*Figure 48: Choose stable chairs with a sturdy back rest for seated farmers sorting and packaging farm products.*

*Figure 49 : Change the work that is usually done on the ground such as raising young trees, sorting farm products etc... so that it is done in a sitting position corresponding to elbow level. Use comfortable chairs with a back rest.*



*Figure 50, 51: Suitable sitting posture for work that requires much attention: table at elbow height, sturdy chair with backrest.*

**CHECKPOINT 11**

***Choose work methods to alternate standing and sitting and to avoid bending and squatting postures as much as possible.***

**BENEFITS FOR FARMERS**

- Alternate standing and sitting while work is done. Changing work postures can allow your muscles to rest after working so as to avoid overuse of particular groups of muscles. Muscle fatigue can be prevented, and the quality of work will be improved.

- Continuing a single posture is strenuous. Continuous standing will cause pains on your shins, feet, and back etc. and then may affect your whole body. Long periods of sitting will increase strain on your low back and can cause low back pains.

- It is of particular importance to avoid strenuous work postures such as bending and squatting. These postures place a strain on your back and cause pains. When you have strain and pains, you will be prone to mistakes and accidents. Frequent changes of work posture can prevent such strain and pains.

**HOW TO IMPROVE**

1.) Provide a standing chair or stool close to your working place. In a standing position, you can sit on the stool by simply leaning. Choose light materials to make such a chair easy-to-move.

2.) Vary the jobs carried out by one farmer so as to change his/her work posture.

3.) Minimize bending posture while working on your farm. Various tools will help you. For digging or cultivating, choose tools with long handles. When spaying water, use a yoke.

**WAY TO PROMOTE COOPERATION**

Exchange ideas and experiences of practical solutions with your neighbours. Find an opportunity to work together with your neighbours so as to vary jobs and to avoid a single strenuous work posture. For example, during harvesting rice, you and your neighbours may alternate between cutting rice and carrying bundles of rice. Work together and evaluate the effectiveness.

**SOME MORE HINTS**

Standing stools or chairs should be appropriate in size and portable. Big and heavy stools may disturb your work.

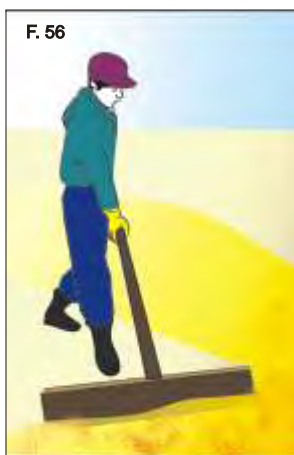
**POINTS TO REMEMBER**

*Continuing a single working posture for long periods is disadvantageous to your health. Find a way to alternate standing and sitting for greater efficiency and comfort.*

*Figure 52: Provide a standing chair or stool close to your working place. In a standing position, you can sit on the stool by simply leaning.*



*Figure 53, 54: Choose work methods to alternate standing and sitting.*



*Figure 56, 57: Limit the bending posture by using tools with a long handle.*

**CHECKPOINT 12**

***Put frequently used tools, switches and materials within easy reach of farmers.***

**BENEFITS FOR FARMERS**

- Put frequently used materials within easy reach so that you will minimize unnecessary movements. By placing frequently used tools or materials within easy reach, you can also avoid strenuous work postures to pick up materials, such as stretching or bending forward. Time and energy can be saved, too.

- The “easy-reach principle” is applicable to various farmers’ tools and materials. Agricultural tools such as knives, hoes, and sickles should be placed within easy reach. At home, the same principle is useful for utensils, spice jars, and spans etc. for cooking. Power switches and controls should be placed in a convenient place, too. All such arrangements will help you complete your work with minimum effort.

**HOW TO IMPROVE**

1.) First, select the most frequently used materials and tools which should be located within easy reach. Select these both on your farms and at home.

2.) Place the selected tools and materials in a place within your reach. Move other tools and materials to appropriate storage places.

3.) If necessary, use shelves, racks or hangers to keep necessary tools

and materials within easy reach.

4.) Work items or hand tools frequently used in the field, such as fasteners, scissors, knives, hammers, or containers for drinking water, can be placed within your easy reach. Design a special belt or a hand bag to carry them along with you while working.

5.) Displays and control panels of pumps, threshing machines and other agricultural machines should be placed within an easy-to-see position.

**WAY TO PROMOTE COOPERATION**

How are frequently-used materials and tools placed within easy reach of farmers? Collect such good examples from your village. They must include (1) home materials such as spice jars, span hangers, tool hangers, shoe racks, and (2) farm tools such as knives, and hoes. Share the local wisdom with your neighbours. Help each other develop innovative solutions using local resources.

**SOME MORE HINTS**

Shelves and materials containers will help you to keep frequently-used materials within easy reach and in an orderly manner.

**POINTS TO REMEMBER**

*Time and energy are saved by placing tools and materials within easy reach.*



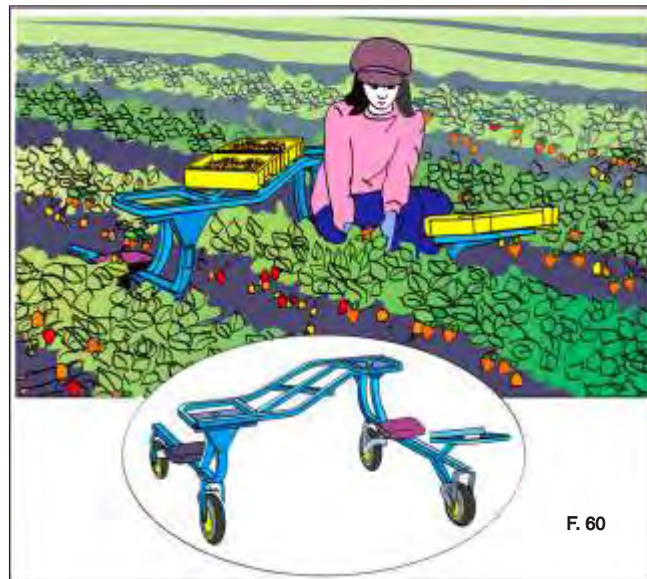
*Figure 57: Provide tools storage cabinets near the working area within easy reach of farmers.*



*Figure 58: Panniers of raw products and materials are placed within easy reach.*



*Figure 59: Frequently used items are placed within easy reach, others placed higher.*



*Figure 60: Mobile work station on which baskets of agricultural products are placed within easy reach of the farmer.*

**CHECKPOINT 13**

***Choose tools that can be operated with minimum force.***

**BENEFITS FOR FARMERS**

- Well-designed, appropriate tools can greatly reduce your workload and improve productivity. Often delicate movements are required in operating tools. Even light fatigue could hamper good work output. When using heavy and bulky hand tools, you will become fatigued even more easily, resulting in low efficiency and even accidents.

- The hand tools necessary for farmers vary depending very much on their work. Rice reaping and fruit picking need sharp knives with good hand grips. Branch grafting or thinning out are precision work which need accuracy in tool operations. On the contrary, greater force is required for pounding, smashing, and cutting. Strong tools with sturdy hand grips are needed. There are many ways to improve your tools and therefore your safety and health.

**HOW TO IMPROVE**

1.) Choose light (but sufficiently strong) tools to reduce the workload on your arm and hand muscles. Bigger tools such as hoes and ploughs need appropriate lengths of bars for holding. Attach sturdy hand grips to the tools to secure safe holding.

2.) Design tools that can ease your work. For example, as shown in figure 61, a manual “line - sowing machine” was invented and has

been used in Vietnam. Farmers no longer need to hold and carry a heavy basket of rice seeds in the rice field.

3.) Rotating work stands or devices at appropriate height will minimize your efforts in lifting heavy objects. These devices are particularly helpful for repairing and maintaining machines and other equipment.

**WAY TO PROMOTE COOPERATION**

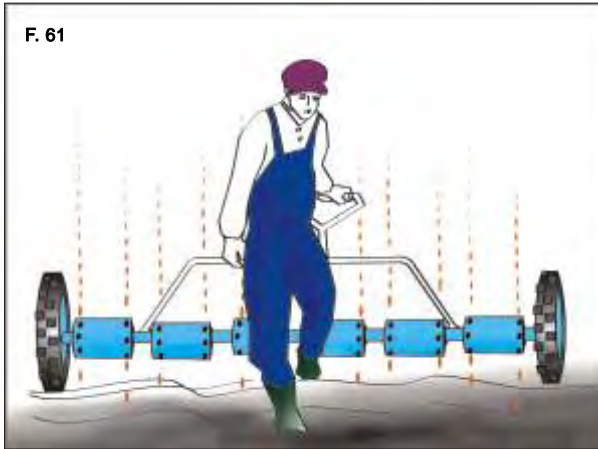
You can find wonderful agricultural tools designed by local people. The tools can save energy and farmers' time by improving safety, health and productivity. Come together and exchange experiences on how to invent new convenient tools using local available resources. Share good solutions with your neighbours.

**SOME MORE HINTS**

Avoid overuse of a particular group of muscles while using tools and devices. Choose and design tools which allow you to use many muscles in good balance.

**POINTS TO REMEMBER**

*Appropriately designed tools and devices help you reduce fatigue and increase productivity.*



*Figure 61: Use a "line-sowing machine". The machine rolls on the field; rice grows in lines convenient for fertilizing and weeding.*



*Figure 62: A hand-reaping machine to reduce the workload of your arm and hand muscles. Sturdy hand grips are attached to the machine to secure safe operation.*



*Figure 63, 64, 65: Design rotating work stands at appropriate height to minimize the lifting of heavy objects.*



**CHECKPOINT 14*****Provide a home for each tool.******BENEFITS FOR FARMERS***

- You may have seen some cluttered work areas where many tools and devices were scattered around on the floor. How did you feel when looking at them? Not safe, not efficient. Precious, often expensive tools and devices can be easily damaged. Time and effort to search for lost tools could be huge. The results are often disappointing. Your stress and strain will be raised, too.

- Providing a “home” for each tool is a simple and effective solution to increase safety and efficiency. Each of your tools should be brought back to its designated position after use. Providing a “home” for each tool allows you to recognize at a glance which tools are still missing. At the end of your work, you will quickly know whether all tools are “at home”.

***HOW TO IMPROVE***

1.) Many farmers have developed simple “homes” for agricultural or cooking tools using bamboo or wood pieces. They can hang knives, sickles, billhooks and others in good order.

2.) Put labels, or draw the shapes of different hand tools on the tool board to show where every item goes. At a glance, everybody will find where tools should go back. This is good for maintenance.

3.) For work which requires a lot of

movement from place to place, design wooden boxes with good handles to keep your tools. Arrange tools in order and draw the shape of each kind.

4.) If you keep many tools, develop a cabinet for storage. Put labels, or draw the shapes to show where each of the tools should be placed.

5.) For small tools or work items, store them in special bins or trays with labels to prevent loss.

***WAY TO PROMOTE COOPERATION***

Start with simple, immediate actions. There are a number of practical solutions such as bamboo-made tool hangers or drawing the shapes of tools. The idea to provide a home for each tool is helpful for house-keeping, too. Invite ideas from your family and share visible achievements.

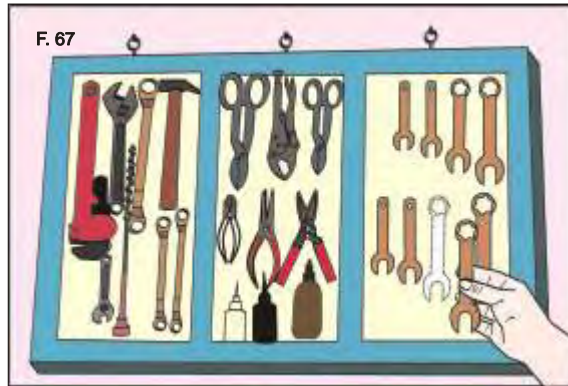
***SOME MORE HINTS***

Attach wheels to your tool cabinets or racks. They can be moved to different work sites when necessary.

***POINTS TO REMEMBER***

*Providing a “home” for each tool is a low-cost way to improve safety, health and efficiency in your work.*

*Figure 66: A simple tool storage cabinet: pliers, hammers, sickles etc. are hung on both sides and are easy to distinguish. Tools are marked and labeled clearly. It is easy to reach the required work items.*



*Figure 67: Use a wooden board to fix tool hangers. Mark the shape of each tool clearly and distinctly.*

*Figure 68: A mobile tools cart helps farmers to ensure smooth work flow in different work places.*



*Figure 69: Multi-level racks to keep agricultural tools. For small tools or work items, store them in special bins or trays with clear labels.*

**CHECKPOINT 15**

***Use jigs, clamps or others fixtures to hold items while work is done.***

**BENEFITS FOR FARMERS**

- Using jigs, clamps or others fixtures, farmers can hold different sizes of work items steadily. Their two hands are now free for any manipulation and therefore their work progresses more quickly and safely.
- Safety and health risks arise when you use your hands to hold work pieces. For example, when cutting materials, your hands may be in danger. You may have to work while bending forward deeply. Slipping of work pieces from your hands may cause injuries, product damage and time-wasting.

**HOW TO IMPROVE**

- 1.) Design and use convenient jigs and clamps to hold your work items. They are particularly useful for fixing parts and components of agro-machines, pumps, naves or wheels when repairing them.
- 2.) Fix the jig or clamp tightly on the work surface or table and adjust the actual work height so that work is done at elbow level or slightly lower than elbow level.

**WAY TO PROMOTE COOPERATION**

Fixtures and clamps can be made locally or purchased for reasonable prices. Promote the habit of using fixtures among villagers when cutting and repairing. Find good solutions and

facilitate the exchange of experiences.

**SOME MORE HINTS**

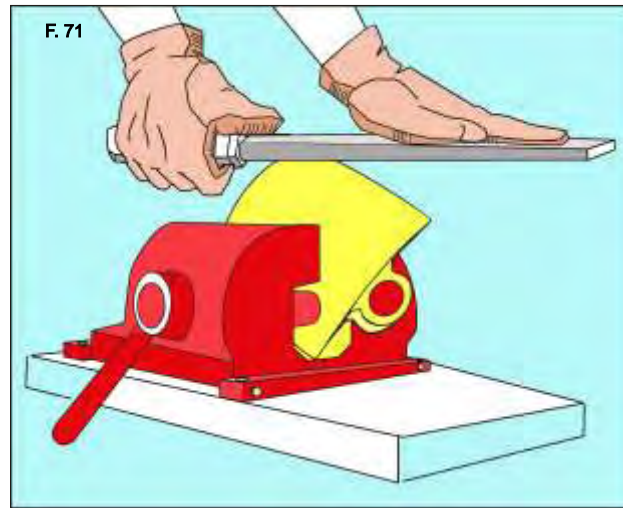
- It is important to adjust the fixing forces to be strong enough to secure the work pieces inside.
- File sharp edges of the clamp to avoid injuring your skin.

**POINTS TO REMEMBER**

*Simple fixture devices will greatly increase your comfort and safety while working.*



*Figure 70: A low-cost fixture device made of wood to hold the work pieces*



*Figure 71: The use of a jig or clamp allows two hands to work freely and productively.*



*Figure 72: A simple fixture device to hold a bunch of small spring onions.*



*Figure 73: Use a fixture device to hold the naves or rollers when they are detached for repair or maintenance.*

