

MATERIALS STORAGE AND HANDLING

Farmers have to store and handle many kinds of materials. They are heavy, and different in size and shape. In this chapter, you will find simple and practical solutions on how to improve the ways of materials storage and handling. The ideas include clear passageways for carrying materials, use of multi-level shelves to keep materials in good order, and application of simple devices such as push carts or roller conveyors. These ideas are all helpful for improving productivity and efficiency as well as safety and health.

CHECKPOINT 1

Keep passageways clear and in good condition for the movement of people and materials.

BENEFITS FOR FARMERS

- Many agricultural products and materials are heavy, varied in shape and difficult to handle. Clear and good passageways can help farmers handle materials easily, prevent fatigue and reduce work time.
- Narrow, rough or slippery passageways obstruct easy transportation of materials. On narrow or unsafe transport ways, loss of agricultural products and damage to precious tools could occur and there may be a higher risk of accidents.
- Similarly at home, wider and well-maintained aisles and corridors contribute to the smooth flow of house-keeping work and help prevent accidents.

HOW TO IMPROVE

- 1.) Make passageways wider and well-maintained. Two-way movement of people, farm products and materials should be allowed on main paths to farm fields and to agricultural facilities.
- 2.) Improve and clean up passageways to and from fields and facilities around your house. Make these passageways take stable and relatively higher routes and cover them with thin layers of stones or small pieces of brick to avoid being muddy during the rainy season.
- 3.) Make sure that obstacles do not remain on the passageways and transport routes. Also make sure that

proper places for storage and waste disposal are present. Try to establish the practice of placing nothing on these passageways and transport routes.

4.) Where canals and ditches are used to reach the farming fields, regularly dredge them. By doing this, boats transporting agricultural products can pass along these water routes smoothly.

WAY TO PROMOTE COOPERATION

- Start with a simple and low-cost way of improving main passageways. For example, clean the routes near the entrance of your house, clean paths in front of your house or paths leading to farming fields or work facilities. People will notice that the transportation has become faster and safer.
- Develop the habit of cooperating among family members or neighbours. For example, regularly maintain and improve the paths. When canals are used, dredge them together.

SOME MORE HINTS

- Make sure that the boundaries of passageways are clear to see. For example, such boundaries become easy to see by placing small stones or covering the routes with cement. Improve passageways step by step. Where appropriate, pave them with bricks or small stones or cover them with cement.

POINTS TO REMEMBER

Cleared passageways can make the transportation of agricultural products easy, prevent injuries and damages.

Figure 1: Keep a wide and clear passageway for two-way movement of people and farm products



Figure 2: Passageway leading to gardens and rice fields is earthed up evenly and wide enough. Carts and trucks carrying agro-products can reach the workplace, avoiding heavy manual handling.



Figure 3: Clear and wide canal for the smooth transportation of agro-products by boat.

Figure 4: Clear and wide entrance marked by a fence of hibiscus.



CHECKPOINT 2

Eliminate sudden height differences and holes on transport routes.

BENEFITS FOR FARMERS

- Transporting agricultural products and materials is an important part of farming work. Keeping the surface of transport routes free of obstacles will make your work flow smooth.
- Carrying loads on rough roads or passageways with many obstacles hampers the flow of work. Sudden height differences and holes on the surface may cause stumbling and accidents, or damage precious agricultural tools and vehicles. Eliminating these height differences can save your time and energy and prevent unnecessary accidents.

HOW TO IMPROVE

- 1.) Remove all the sudden height differences and obstacles in the passageways to farm facilities and fields. Fill in all holes or dents that may cause stumbling or disturbances. Or alternatively, use wooden planks to cover such differences and holes.
- 2.) Where height differences occur between two parts of the routes or between the routes and the field, use ramps by making the way in a sloped form or by using platforms. Such ramps can help smooth the movement of wheeled equipment and vehicles.
- 3.) Frequently fix or repair fill-ins or planks

used for sudden height differences and holes. In so doing, widen the main passageways or ramps to allow two-way transport.

WAY TO PROMOTE COOPERATION

- Maintenance of good transport routes without obstacles is the task of everybody in the family and in the community. Groups of farmers can take the voluntary initiative for regular maintenance of these routes. This cooperation can be expanded gradually to the whole community.
- Make it a routine community activity to maintain passageways and remove dangerous height differences.

SOME MORE HINTS

- Place outstanding and easy-to-understand warning signs at dangerous height differences that cannot be removed.
- The surface of ramps or slopes for transportation purposes should be covered properly to reduce the risk of slipping.

POINTS TO REMEMBER

Maintaining routes without dangerous height differences provides a simple, but important solution to safe transportation. This requires cooperation of all people concerned.

Figure 5: Clear obstacles and holes along the pathways. Replace rotten planks of bridge with new ones.

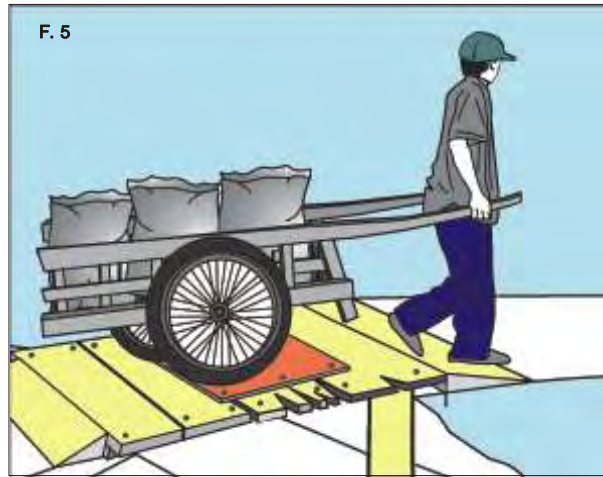


Figure 6: Use a sloped platform at the heaps of earth or rough field edges.



Figure 7: Provide ramps with a small inclination over stairways for easier pushing of carts or wheeled racks.



Figure 8: Provide sloped form in the rice field for the smooth movement of agro vehicles.



Figure 9: Eliminate holes and obstacles on the rice field.

CHECKPOINT 3

Construct wide enough and stable bridges over canals or over ditches at the edge of a field or road.

BENEFITS FOR FARMERS

- Safe bridges over canals or ditches are essential for the safe travel of local people and for the efficient transportation of farm products.
- Even small ditches at the edge of a field or road need appropriate bridges. Jumping across them or using makeshift types of bridges can cause accidents and damage to products. Consider sharp-edged tools or grass-cutting tools can cause severe injuries.
- Narrow, rough or slippery passageways hamper easy transportation of materials. On narrow or unsafe transport ways, loss of agricultural products and damage to precious tools could occur and there may be a higher risk of causing accidents.

HOW TO IMPROVE

- 1.) Check the passageways and transport routes leading to farm facilities and to farm fields. Make sure not only canals and rivers but also ditches at the edge of fields and roads are properly bridged. The bridge should be stable and wide enough for farmers to transport farm products or machines and tools.
- 2.) Build safer and stronger bridges. Try to make the bridges wider. Add firm handholds for larger bridges over canals or rivers. Check conditions of the bridges regularly and strengthen the bridge frames if necessary.

3.) Eliminate height differences along the routes leading to bridges. Make the surfaces of the routes even and without obstacles. Planks or other sturdy materials can be used to cover the surfaces.

WAY TO PROMOTE COOPERATION

- Form a team of farmers in the same community and encourage the team to jointly check bridges over canals and rivers. In consultation with local people, the team can jointly plan and construct or improve necessary bridges. Cooperate with community leaders and local authorities.
- For small ditches, try to follow good examples found in the community. Cooperate with neighbours to regularly examine the conditions of bridges used by local people. Repair the rotten or damaged parts of bridges by your joint effort.

SOME MORE HINTS

- Where makeshift types of small bridges are used, make sure that they are not slippery and wide and sturdy enough to allow the passage of wheeled equipment.
- Space under each bridge over a canal or river should be large enough for boats to pass safely. For bridges over ditches, the space under them should be properly maintained so as not to disturb water flow.

POINTS TO REMEMBER

Bridges which are stable and wide enough can provide farmers with a safe transportation means and help enlarge the communication among people.



Figure 10: Wooden bridge with firm handholds constructed over stream. Bridge bed is wide enough, for the transport of people and farm products.

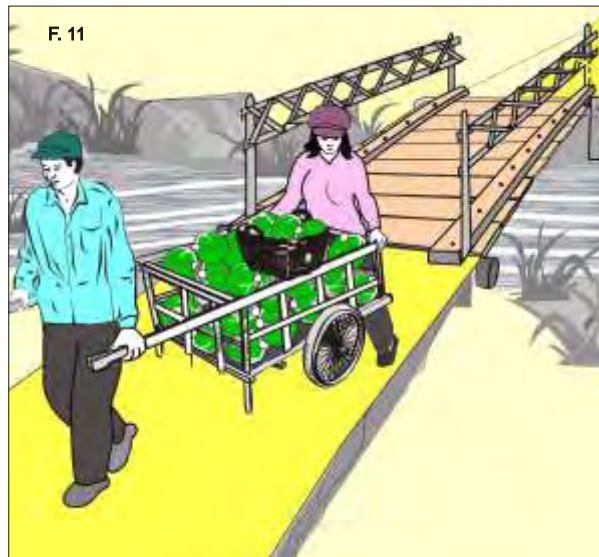


Figure 11: Where there is a narrow ditch, a firm bridge can facilitate the transportation of farm products.



Figure 12: Build safer and stronger bridge across the river.

CHECKPOINT 4

Use multi-level shelves or racks near the work area for storing materials, tools or products.

BENEFITS FOR FARMERS

- Multi-level shelves and racks allow a better use of space and help you keep farm products or agricultural tools in good order. By placing things on multi-level shelves, you can easily find necessary items at an appropriate height, and therefore save your time.
- Agricultural hand tools are essential for farmers. By keeping the tools at specified places, farmers can save their precious time and energy in picking them up.
- Multi-level shelves and racks can also reduce the danger of accidents and fires as things kept there are more easily and more safely maintained.

HOW TO IMPROVE

- 1.) Place multi-level shelves and racks at places easy to access. Make full use of wall space by fitting multi-level, open-fronted shelves or racks to the wall.
- 2.) Put labels or draw shapes of different items or tools on the front end of shelves or containers to show where each item is kept. This saves time for searching.
- 3.) Prepare multi-level shelves strong enough to store heavy farm products or other heavy items. It is better to place such shelves close to the wall.
- 4.) Multi-level racks are also useful for your kitchen. You can keep pots, pans, knives, spoons and other utensils as

well as cooking materials and ingredients neatly on the racks. Containers of ingredients, such as salt, sugar, peppers, spices and cooking powder, etc., should be corked and labeled.

WAY TO PROMOTE COOPERATION

Start with a small change. For example, a shelf for small utensils or ingredients is easy to make. All family members can see the change. This immediate change stimulates other family members and community people to apply the same ideas. Try to spread the habit of labeling important items. Encourage people to exchange good examples.

SOME MORE HINTS

- Place frequently used items at a level between your waist and shoulder. Keep heavy and less frequently used items at a lower level. Light and infrequently used items can be stored in the overhead space.
- Use small trays or pallets for storing similar items. This makes it easy to find the necessary items.
- If appropriate, make some of the racks movable or use trolleys. Things used in different places (e.g., in the storage and in the work room, or in the kitchen and the dining room) can be kept in such movable racks.

POINTS TO REMEMBER

Proper use of multi-level shelves and racks can save your time and space.

Figure 13 & 14: Well-designed multi-level racks for farm products. It looks tidy and save a lot of space in your house.

If appropriate, make some of the racks movable (Figure 15).

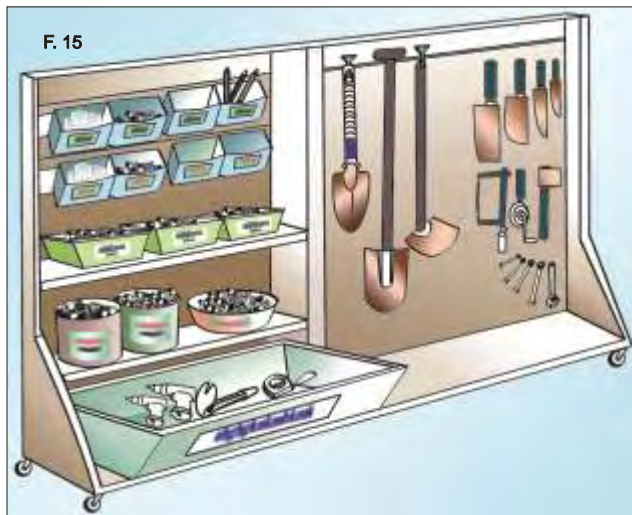


Figure 16: Agricultural hand tools and personal protective equipment are placed tidily and in order on the hangers and multi-level racks.

Figure 17: Multi-compartment cabinets contain spices, food for cooking and utensils needed by housewives.

CHECKPOINT 5

Provide containers or baskets of appropriate sizes and with good grips to carry materials and farm products.

BENEFITS FOR FARMERS

- Carrying heavy items is strenuous and can be dangerous. It is always wise to use containers and baskets properly designed for each kind of loads. Containers or baskets are essential when carrying easy-to-slip heavy items.

- Divide heavy items into smaller objects. Containers and baskets of smaller sizes are often very helpful. Fatigue from carrying lighter packages is less than in the case of carrying heavy weights. The risk of back pains and injuries is also smaller.

- Good hand grips have multiple effects. The grips help you handle the materials easily. Besides, a simple hand grip attached to your loads ensures a clearer forward view. Holding loads in front of you blocks your forward view and may cause an accident. Hand grips also prevent dropping loads and damaging materials. A good hand grip can improve your work posture and prevent fatigue.

HOW TO IMPROVE

1.) Set your own weight limit of the load carried.

2.) Divide the carried loads evenly in both arms. Carrying two packages of 10 kg each is better than carrying one package of 20 kg.

3.) Choose containers or baskets of

relatively small sizes. Lighter loads are easier to carry and facilitate the use of carts, trolleys and hand trucks.

4.) Choose containers, packages, bags and baskets that have proper grips or handles. Or you can attach them yourself.

WAY TO PROMOTE COOPERATION

- Learn from existing experiences of using containers and baskets of smaller sizes. These may be purchased at low cost or made manually. Discuss what shapes, materials or sizes are useful for carrying particular kinds of farm products or materials.

- Explain to everybody that adding grips or handles can be done at low cost. You may find existing good examples of using appropriate grips in your neighbourhood. Encourage people to exchange such good ideas.

SOME MORE HINTS

- Choose small containers that can be easily and safely piled up. This will make loading and unloading of these containers much easier and faster.

Wearing gloves or wrapping grips or handles with soft cloth may ease carrying of loads.

- Keep the wrist in a comfortable and straight position while holding grips. If necessary, enlarge the holes adjacent to the grips.

POINTS TO REMEMBER

A lighter weight is a safer weight. Divide heavy packages into lighter ones to ensure safety and higher productivity.



Figure 18 & 19: Put farm products in small bags with firm handles. Proper weight carried in both arms makes your work more comfortable.

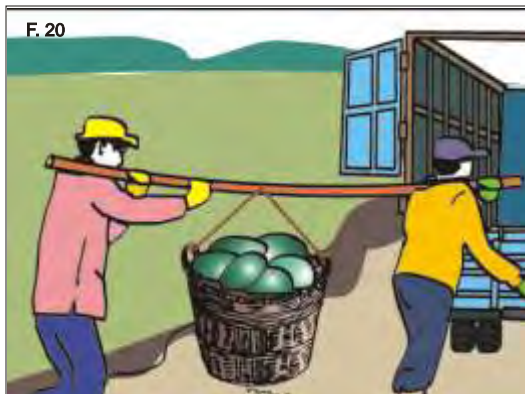


Figure 20 & 21: Use a pannier with firm hand grips, heavier things can be carried by 2 persons.

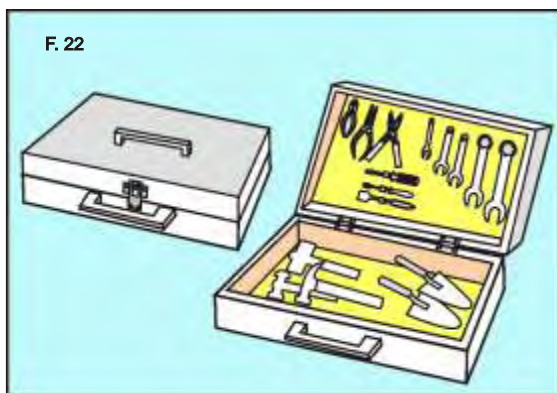


Figure 22 : Add handles to the tool boxes.

Figure 23: Choose containers or baskets that have proper grips or handles.

CHECKPOINT 6

Use carts, boats, vehicles or animals to carry heavy materials.

BENEFITS FOR FARMERS

- Farmers need to carry agricultural products and tools everyday between farms and storage areas. By using carts, hand trucks, vehicles or boats, you can greatly reduce your workload and fatigue.
- By carrying farm products on carts and vehicles, you can minimize their damage and accident risks.
- The use of carts, hand trucks or vehicles can significantly reduce the number of trips. This is very advantageous for improving efficiency and safety.

HOW TO IMPROVE

- 1.) Use carts or hand trucks with firm handles for carrying heavy materials or a large quantity of materials. You may need to improve passageways and bridges for the effective use of carts and hand trucks.
- 2.) Use larger carts or available vehicles to carry materials at a distance. Make sure that these carts or vehicles are adapted for carrying the particular products or materials.
- 3.) Take advantage of using canals and rivers to transport materials. Motored boats will make your work much easier especially when carrying extremely heavy loads or a large quantity of materials.
- 4.) Use cows, horses, buffaloes or goats to pull carts for carrying materials and products.

WAY TO PROMOTE COOPERATION

Walk around your village with fresh eyes. Discuss with your neighbours how they carry loads. Everybody must have some experience in using carts, vehicles, boats or animals. There may be excellent examples of using self-made carts or hand trucks. Exchange ideas and experiences to reduce your workload and to improve your safety.

SOME MORE HINTS

- Attach appropriate side-boards to carts or hand trucks to prevent products or materials from falling down while they are carried.
- Use different types of carts or hand trucks for different kinds of transport work. Learn from examples found in your neighbourhood.
- Check the conditions of carts, hand trucks, vehicles and boats regularly and keep them always in good condition. Simple maintenance activities will reduce your fatigue and accidents while carrying loads.
- Well-maintained transport routes will maximize the effectiveness of using carts, vehicles or animals for carrying materials.

POINTS TO REMEMBER

There are many kinds of devices which are useful for carrying heavy materials in the local conditions. You can learn from local experiences.

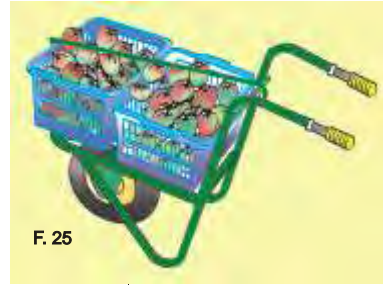
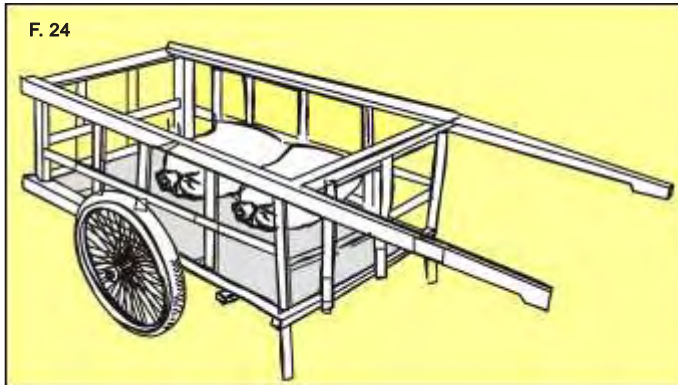


Figure 24,25,26: Use carts and hand-trucks to carry heavy objects and farm products.

Figure 27, 28: Modify your bicycle so that it can be used as a means of transport.

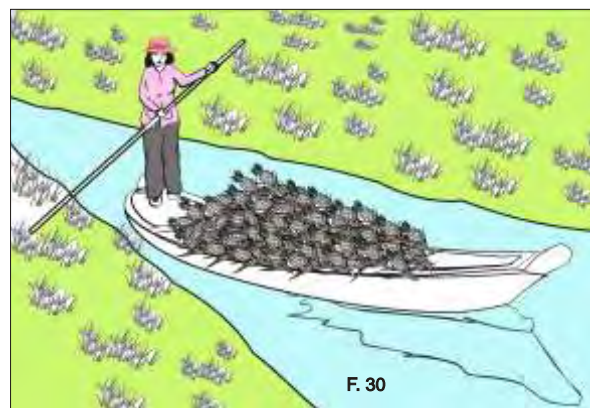
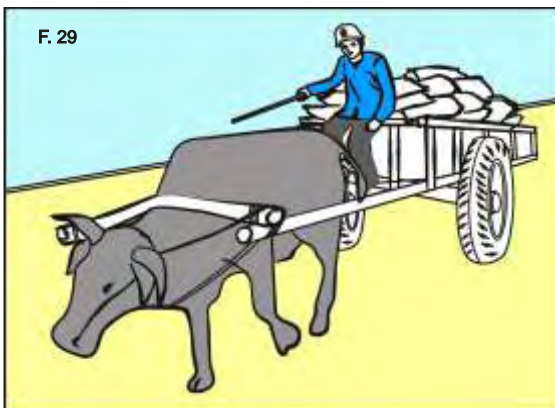
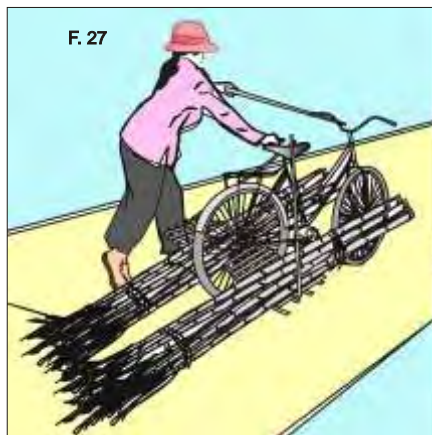


Figure 29: Hand-truck pulled by animals.

Figure 30: Farm products transported by boat on the river.

CHECKPOINT 7

Attach large enough wheels to carts and hand trucks to work effectively on field routes.

BENEFITS FOR FARMERS

- Carts and hand trucks with bigger wheels can work even on bumpy and muddy field routes. Since transporting farm products and other materials from one place to another does not add any profits, longer transportation time on bumpy routes will only increase damage to products.
- Large wheels make the transport work easier and reduce fatigue of farmers. These large wheels also contribute to preventing accidents particularly on field routes with gaps and height differences.

HOW TO IMPROVE

- 1.) Check the wheels used in your carts and hand trucks. Are they large enough? If not, attach bigger wheels.
- 2.) If available, choose rubber wheels. Inflate them enough to go smoothly even on bumpy routes. Often, used bicycle or motor-cycle wheels will meet your requirements.
- 3.) Attach pushing or pulling handles to carts and hand trucks so that they are moved easily at the waist level .
- 4.) Design special carts or hand-trucks for different products so that the products are protected from damage and easy to load or unload. Check the stability of the attached

wheels. Bigger wheels need stronger fixing and frames.

WAY TO PROMOTE COOPERATION

Exchange ideas about how to make wheels of appropriate size. Learn from existing examples. Find and use available materials such as bicycle wheels, used planks, etc. For better designs consult with each other based on your and your neighbours' own experiences. Not only wheels but also other parts of carts and hand trucks need your ideas for improvement. Neighbourhood cooperation will enhance greatly when you have jointly designed carts or hand trucks minimizing physical efforts and protecting farm products against spoiling.

SOME MORE HINTS

The height of carts and hand trucks may increase when attaching bigger wheels. Appropriate platforms may help farmers to load and unload materials when using carts with larger wheels.

POINTS TO REMEMBER

Carts and hand trucks having well-designed bigger wheels greatly help farmers to carry materials, even on bumpy, muddy or uneven field routes.

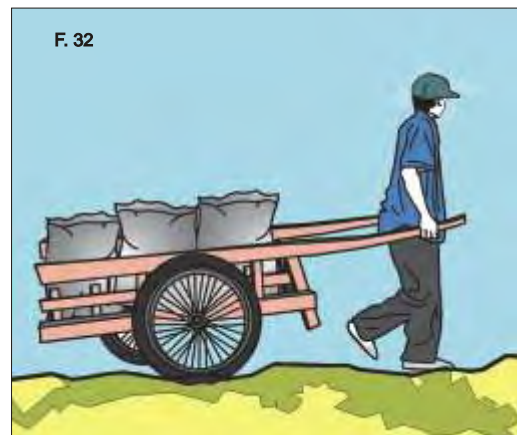


Figure 31, 32 : On rough roads, it is easier to push or pull hand-trucks with big wheels than those with small wheels.

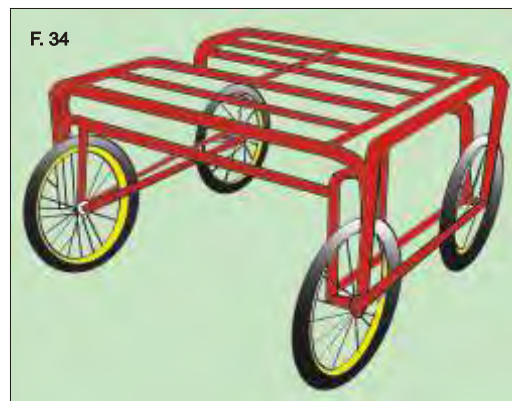
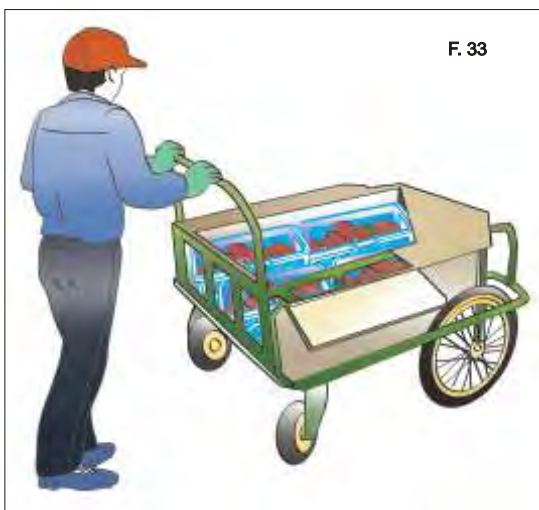


Figure 33, 34: Use wheels with hard rubber tires to reduce friction when moving on the field.



Figure 35: Wheeled work station to pick up strawberries.

CHECKPOINT 8

Use roller conveyors or other mechanical means for moving or lifting heavy materials.

BENEFITS FOR FARMERS

- Hand-made rollers or wheeled platforms, often made of locally available materials, are used by many farmers. These simple devices can help farmers move heavy materials such as agricultural products, machines and packages. Rollers placed in the form of a conveyor are particularly useful where heavy materials are moved regularly.
- Rollers that bridge height differences can allow farmers to move heavy materials without manual lifting or lowering. Farmers can thus avoid awkward and strenuous bending postures that may cause low back pains.
- Similar ideas can be applied to various farming work. For example, wooden rollers put under a heavy agricultural machine or boat make the moving work much easier.

HOW TO IMPROVE

- 1.) Try to use roller-conveyors when heavy materials are moved within a short distance. Put the both ends of rollers on stable places at the height appropriate for loading and unloading the materials.
- 2.) Learn from existing ways of using rollers or wheeled devices for moving materials. Design appropriate roller-conveyors or wheeled platforms for your moving work. Select durable

Materials that can sustain heavy weight safely.

3.) When moving heavy objects on the ground or on passageways, wooden rollers put under them may help your work greatly. Examples include carrying an agricultural machine to the rice field, moving boats to the river bank or moving a heavy cabinet.

4.) Use inclined roller conveyors for moving heavy materials between two places with a height difference. For example, when moving rice bags or heavy packages from storage areas to near-by platforms, or when moving farm products to or from vehicles or boats.

WAY TO PROMOTE COOPERATION

Roller-conveyors can save the energy of people and provide them with opportunities to work together. Exchange ideas about how to apply the roller-conveyors for various types of moving work and design an appropriate one jointly.

SOME MORE HINTS

Rollers and conveyors need good maintenance. Check all parts, such as rollers, steel beds or rubber beds, at regular intervals. This is important to prevent accidents. If your rollers or conveyors are portable, keep them in a safe place away from children when not in use.

POINTS TO REMEMBER

Roller conveyors provide us with an effective means of moving heavy objects within a short distance.



Figure 36: Use a wooden bed with wheels to move heavy agromachinery.

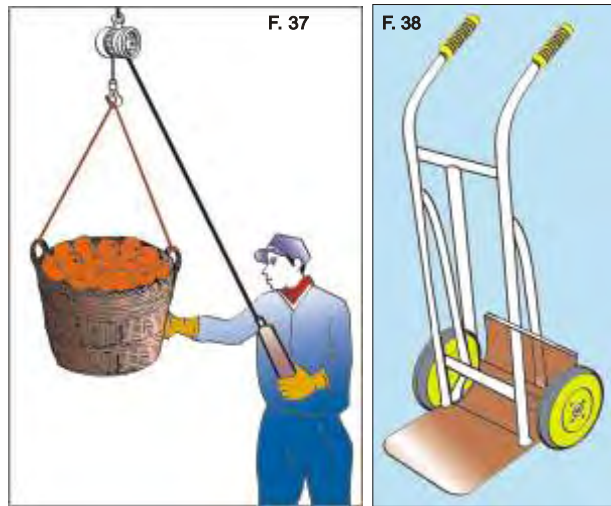


Figure 37: Electric chain hoist with a control switch for efficient lifting of heavy loads.

Figure 38: Hand trolley lifter for arranging and moving rice bags.



Figure 39: Short conveyors are very convenient for the movement of agricultural bags or farm products from one place to another.



Figure 40: A manually powered device for lifting heavy item to working level.

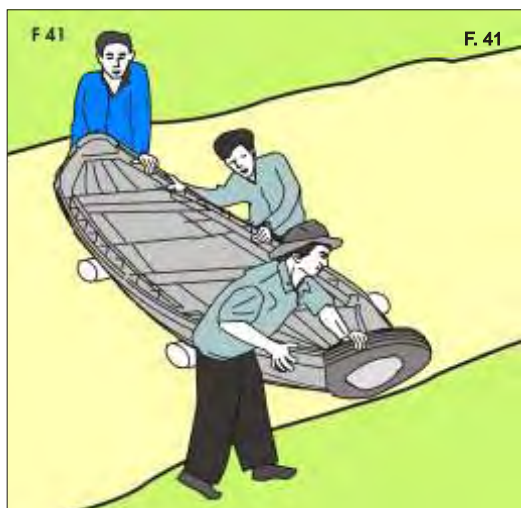


Figure 41: Use rollers to move heavy objects over short distances.

