

## ASSISTIVE TECHNOLOGY AND MODIFICATION OF WORKSITE: KEY TO ENABLING THE DISABLED IN GARDENING ACTIVITIES

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### Abstract

*India, the largest democracy in the world, is basically agrarian in nature. Two thirds of the Indian population lives in villages. Most of these villagers are either farmers or engaged in agriculture based or related works. There are thousands of villages in remote areas which wholly depend on farming only for livelihood. They live far from the madding crowd without any social or vocational link with urban society or technology. There are millions of farmers in rural India affected by disabilities. Nationwide, approximately forty million farmers have a disability that affects their ability to perform one or more essential tasks. For many such farmers disability jeopardizes their rural and agricultural futures. Although farming may be hazardous to agricultural producers with or without a disability, many people within the agricultural farm community believe that farm hazards and injuries are a part of farming and the inherent uncertainties that are associated with it (Murphy, 1992). We have to reach out to these farmers with disability and enable them to do their work significantly in a better way with a higher degree of independence and competence. It is a formidable task with its own challenges and hurdles. But these challenges can be tackled and the problems of the disabled farmers related to their daily living and farming can be overcome to a great extent by means of rehabilitation and extension activities. This paper examines the working conditions of the disabled people and enumerates the various kinds of assistive technologies which can be of great use in enabling the disabled people in farming activities besides highlighting the modifications of worksites and equipments required for facilitating the farming activities of disabled people.*

### Introduction

India lives in villages, so said Mahatma Gandhi, the father of our nation. About 90/ of the villagers are farmers. They depend on farming only for their living. It is not that all these farmers are abled. There are millions of farmers with disability. Despite their disability, they carry on their farming works with great difficulties. They trudge and stagger to earn their daily bread. They are an integral part of our human resource. We cannot leave them as they are. We have to enable the millions of disabled farmers to work better in their farms with a higher degree of independence and competence. We should enable them to produce more, earn better, stand on their own and to make significant contribution to the economic growth of the country. For the last two decades, adult

education and extension programmes have been focussing on adults and youth with disabilities. If we ask anyone, whether he or she knows a person living with disabilities, he or she will answer yes to the question. Before we dwell upon the disabled persons and enabling them for farming, we must know what a disability is. According to the Americans with Disabilities Act an individual with as disability is a person who has a physical or mental impairment that substantially limits one or more major life activities (ADA act of 1990). From the above description we can understand that there are millions of farmers with disabilities in India, although millions are reported to have a degree of disability that does not limit them from succeeding at life goals. Farming is also among the few occupations in which family members of the worker are also at risk for injury because the worksite often is an integral part of the living area. Although technology has considerably reduced the physical rigour of farming, agricultural workers are still twice as likely as other workers to experience a disabling injury and six times more likely to suffer a fatal injury. The hazards associated with agricultural production have always been an intrinsic part of the lives of farmers, ranchers, herders and other agricultural workers. Assistive technologies may be low tech or high tech, expensive or inexpensive, but ultimately it makes it possible for someone to complete a job that might otherwise be difficult. While technology can make life easier for everyone, assistive technology can make farming possible for individuals with a disability. Plethora of assistive technologies can be employed by the disabled individuals, depending on the nature of disability and the challenges posed. These assistive technologies may be designed specifically for the persons with disabilities.

Tools and technology are required by everybody to make life easier and perform tasks with more efficiency and comfortably. However, persons with disabilities face even greater difficulties and challenges in performing routine activities of life. These challenges are especially evident in case of individuals with disabilities involved in agriculture. Farming is traditionally a labour-intensive profession involving physically demanding work. With the application of assistive technology, disabled farmers can maintain their independence and productive lifestyle on the farm. Farming and ranching is a time-honoured profession that also happens to be one of the most hazardous and dangerous occupations, equating to a high rate of injuries. Many of these injuries result in a permanent disability. These disabilities impact a producer's ability to perform many of the day-to-day tasks necessary to their operations. There is evidence to suggest that some disabling conditions may increase the risk for secondary injury if preventive steps are not taken.

#### **Barriers Faced by Disabled Farmers**

Barriers faced by farmers and ranchers with disabilities include lack of information on effective worksite accommodation, economic constraints resulting from lack of wage loss

insurance, isolation from needed services, lack of professionals trained on how to help people accommodate their disabilities, and negative attitudes among professionals in the medical, rehabilitation, and agriculture related industries towards the ability of agricultural workers with disabilities to continue in a high risk physically demanding occupation. In addition to those barriers related to returning to farming despite disabilities, many farmers and ranchers are also at risk of acquiring secondary injuries or secondary conditions. The Rural Research and Training Center at the University of Montana states that the average person with a disability reports 14 secondary conditions. More than 400,000 people who use manual wheelchairs experience serious secondary injuries to their shoulders, wrists, backs, and other parts of their bodies (See man, 2000). Furthermore, Anson and Shepherd (1996) state that individuals who are six or more years post-injury have a higher incidence of secondary complications than those who have been injured less than five years.

Co-workers and caregivers are also at risk when assisting an agricultural producer with a disability or using equipment that has been modified. Caregivers often lift the operator with a disability in and out of farm machinery. In one study of 20 co-workers who were required to use a tractor that had been modified for a farmer with a spinal cord injury, 65% reported cuts, bruises, knee pain or shoulder injury due to slipping, falling, or incidental contact with the tractor modifications (Willkomm, 1997). Reaching as well as enabling the disabled farmers in the far flung rural areas is not an easy task. We encounter a number of challenges in this onerous task.

However, these problems can be overcome by taking appropriate enabling measures to facilitate the farming activities of PWD.

### **Enabling Measures**

Concrete measures are essential to enable the disabled farmers to work better in their farms with adequate confidence, competence and independence. These measures include

- Providing assistive technology
- Modifying work sites, equipments etc
- Providing adequate and appropriate training
- Providing funds and loans
- Reaching through extension activities

### **Enabling Role of Assistive Technology**

While technology can make things easier for everyone; assistive technology can make farming possible for individuals with disabilities.

What is assistive technology? Assistive technology for people who live in farming communities includes any kind of device, modification, or service that will help a person with a disability work and live more independently in the rural setting. An assistive technology device is any item or piece of equipment used to maintain or improve the functional capabilities of people with disabilities, allowing them to function independently in any setting including: recreation, education, employment and daily living.

What kind of devices is available? Farming is traditionally a high labour intensive profession that involves physically demanding work. Farming tasks that can be physically demanding include:

- handling livestock
- climbing grain bins and silos
- operating heavy equipment
- moving bulk supplies and materials

Today's farmer can use automated technology solutions for these labour intensive processes, creating solutions that make work easier for people with disabilities. Assistive technology for farming operations can include, but is not limited to:

- electronics monitoring systems
- hydraulics
- computerization
- motorized lifts
- outdoor mobility aids
- modifications to farm buildings
- farm tools
- the farm house
- modifications for farm machinery
- prosthetic and worksite adaptations
- Automated gates.

#### **Need for Modifying Worksites, Equipments etc**

Modifications to farm machinery, tools, and buildings are made to accommodate the unique needs of the individual. Unlike other industries, where products are tested for years, farmers with disabilities often need one-of-a-kind solutions for one of a kind types of needs. Therefore, the chance of the modification failing, causing injury to the individual or co-worker continues to exist. The degree to which an agricultural worksite modification maximizes the abilities of the producer and reduces risk of secondary injuries depend on such factors as follows.

- The severity of the producer's disability and associated secondary complications.

- The producer's medical history regarding the disability and his or her current prognosis.
- The nature of the agricultural production tasks to be performed.
- The skills and abilities of the producer with a disability.
- The availability of caregivers or co-workers
- The availability of needed worksite modifications and funding to pay for them.
- The age of the producer
- The skills of the individuals making the worksite modifications or providing needed services.

The prevalence of these risks and the frequency of resulting incidents need to be documented and shared. Such information can potentially inspire others who are designing and fabricating modifications for their own agricultural operations to learn about potential secondary injuries and their causes. The result may be development of effective interventions that prevent or reduce these risks. The issue of informed risk is ethically very important. Risks will always be present in agricultural production; therefore they should be made as clear as possible so that workers affected by them can make informed choices in their regard. The following are some modifications made for disabled farmers to enable them to keep working on their farms.

- Modified caravan and boat - spinal cord injury
- Hand Operated John Deere Gator - lower limb disability
- Modified Chrysler Voyager - wheelchair suitable
- Transportable Hydraulic Hoist - access tractors, headers etc.
- Modified Ferris Zero Turn Mower
- Overhead Winch - tractor access
- Hand gear change for ATV
- Easy use irrigation system
- Wheelchair transfer to farm vehicle
- Pool access winch
- Additional seat for easy quick transfer
- Tractor access - hand winch system

#### **Providing Adequate and Appropriate Training**

Providing assistive technology and making modifications in the worksite alone will not suffice. We have to provide for proper orientation and training in the use of assistive technology and modified equipments. Then only secondary injuries can be averted. They should have an in depth insight into updated resource material on equipment modifications and case history knowledge about farming and ranching with specific

disabilities. The disabled farmers must be oriented how to access valuable information and learn from and share information with others. They should be enabled by means of training or orientation how to understand the causes of secondary injuries and solutions to prevent or reduce such injuries. Their skills must be developed in making risk assessments based on prior knowledge of accidents and injuries that occurred while performing specific tasks. They need adequate training to identify specific methods, materials and resources for farming with a specific disability. In Indian context, whenever there is technology integration in the daily work, proper training is most important. The disabled farmers should not be scared of assistive technology or modified equipments. To ensure this, proper training or orientation is indispensable. Once their confidence level is increased in the use of assistive technology and modified equipments, they will be able to work with greater degree of independence and competence.

#### **Providing Funds and Loans**

There are various organizations to promote the welfare of the disabled persons in farming. The National AgrAbility Project administered by USDA - Cooperative State Research Education and Extension Service (CSREES) is proud to have a role in enabling people with disabilities, whether they are owners of small farms, hired hands on large ranches, or migrant workers for a corporate grower, to participate fully in the American agricultural workforce and be a part of the rich fabric of rural community life (Rein, 1999, p.2). AgrAbility Australia Research Centre AgrAbility in America, Breaking New Ground in Purdue and AgDare are the pioneer ones in this regard. In India too, we have the Project, ADD India, ADIP Scheme, NHFDC and other state government and central governments schemes. These organizations in India together with the state and central governments provide for the welfare of the disabled farmers in various ways to carry on their farming works undeterred.

#### **Reaching Through Extension Activities**

What are the provisions available for the farmers with a disability have been highlighted in the above paragraphs but merely making provisions for subsidy and loan will not suffice. We have to make sure whether these provisions reach the disabled farmers at the grass root level in the far flung country side. We have to see how many disabled farmers are aware of the provisions available for them and how many of them have been the real beneficiaries. Whether grant or no grant they are toiling everyday to make a living. About 80% of the disabled persons depend on farming activities only to earn their daily bread. With adequate assistance in the forms of means and materials they will be able to enhance their productive rate which will contribute to the economic growth of the country in its own way. This is where the extension activities can do a lot. Extension activities are

the various tentacles of the government to reach the disabled farmers at the grass root level. The government can through its departments and NGOs reach the stakeholders at grass root level. Extension activities are very indispensable to identify, to make assessment and to provide for appropriate assistive services. The functionaries and the voluntary workers in NGOs should gear up their united efforts to visit far flung areas in order to identify the deserving people with disabilities and to make an in depth assessment of their requirements. On the basis of their assessment, appropriate assistive services should be provided to such deserving disabled farmers. Only these intensive efforts can make disabled farmers the real beneficiaries of the various schemes extended by the governments.

#### **Garden Equipments for People with Disabilities**

Garden equipment can be adapted in many ways to suit people with varying disabilities. They have to consult an occupational therapist for expert advice. Suggestions include:

- Using tape, foam padding, bicycle grips and PVC pipe to improve grip and handle length on tools.
- Finding specific ergonomic (designed to reduce discomfort) and enabling tools - these are available at some hardware shops.
- Using gloves that have a sticky surface or gloves with gripper dots.
- Using of splints and supports may also be appropriate - consult an occupational therapist.
- Looking for lightweight tools that are easier to handle.

#### **Making Garden Accessible to PWD**

To provide easy and safe access and to accommodate people with a range of disabilities, we need to make some modifications when planning our garden, including:

- Raising garden beds to help people with physical restrictions, and to avoid bending and stooping.
- Providing tables that are wheelchair accessible where people can do potting and planting together.
- Using pots, window boxes, wheelbarrows and raised containers to make gardening more accessible - these can also be used when space and sunlight are limited.
- Providing retractable hanging baskets that can be pulled up and down so they are within easy reach.
- Using containers with wheels, which can be moved around easily to accessible positions and to catch the sunlight.
- Keeping paths smooth, non-slip, accessible and level.

- Having a water supply handy and placing plants together according to their water needs.
- Having an equipment storage area or shed nearby.
- Providing shade for working in the garden in summer(remember to use hats, sunscreen and other sun protection)
- Providing ready access to toilets.

### Conclusion

The global society is rapidly marching towards inclusivity and access to affordable and reliable technology for empowering the persons with disabilities. This has opened up plethora of options for self-employment of such individuals in agri-business. Vigorous labour intensive-tasks involving the use of two strong arms, legs and back could now be performed easily by them with the help of highly automated machines or scientifically adapted agricultural devices (such as, the introduction of new herbicides to control weeds). Especially since the decade of 1970s, spectacular advances have been made in prosthetics and orthotics in regard to lower-limb prostheses and electric-powered upper-limb prostheses. There is now plenty of scope for farmers with missing limbs or organs or parts of the body or sensory loss to compensate their disability considerably with the application of a range of specialized assistive devices. With assistive technology and modifications of worksites, equipments etc., the people with disabilities will not be left far behind in productive activities which will ultimately tell upon their self confidence and economic independence. With increased level of confidence and competence, they will be able to play a significant role in productive farming activities as others.

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