SUPPORTING TECHNOLOGIES FOR DIFFERENTLY ABLE PEOPLE IN FARMING ACTIVITIES

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ABSTRACT

Agriculture sector is the backbone of Indian Economy. About 74 percent of India's population is either directly or indirectly engaged in agriculture activities. Nearby 54percent of the disabled workers are engaged in agriculture activities as per 2011 census. A people with disability (PwD) can also do agricultural activities effectively with due support. The Government offering different types of supporting devices to this people. These disabled people involve in the agriculture and allied activities, which contribute largely to the growth of Indian economy. The developed countries like USA, Australia and Canada also provide different types of assistive technology for disabled communities in agricultural segment. This paper attempts to study about the types of assistive devices have been utilized in practice for the various agro-allied activities in different countries and the measures needed in India to bridge the existing gap.

Keyword: Raised bed garden, Agrability, Ergonomic garden tool, fencing gate.

INTRODUCTION

There is no universal definition of what constitutes a disability. A disability is a result of the interaction between a person with a health condition and a particular environmental context. Having access to technical aids, services or physical adaptation to the environment may allow individuals to overcome their disabling conditions. Blindness, low vision, leprosy cured, hearing impairment, locomotor disability, mental retardation, mental illness and so on are generally considered as the categories of disabilities in India. As per 2011 census 2.68 crore individuals were ' disabled ' in India out of the 121 Crore Indian population, representing 2.21 percent of the total. Of the total disabled workers, 23percent is categorized as cultivators and 31percet categorized as agricultural laborers. Association of People with Disability (APD) is a Non-Governmental Organization in India. It has been improving the lives of under privileged people

with disabilities since 1959. It was established in Bangalore and conducts widespread programs in urban and rural Karnataka to enable, empower and equip adults and children with a kind of disabilities including spinal cord injury, locomotor, cerebral palsy, speech and hearing and to some level, mental issues. This organization is providing assistive devices for this people. Like this, rehabilitation centers are there for helping but it is very few and particularly have a very less assistive device for agricultural activities. In USA, 'Agrability' is a big concern, they offer plenty of devices to the person with disability working in agriculture sector. Indian government also initiate to assist these people by offering new technological handholding support for their agriculture segment. Agriculture is historically a hardworking profession, a physically challenging task.

REVIEW OF LITERATURE

William E Field and Paul Jones(2006) noted that pressure has intensified to insure that rural people's health needs, including producers, ranchers and farm workers with severe disabilities, are addressed at a similar level of enthusiasm, productivity, experience and services as seen in most urban settings. Nevertheless, the inequalities are still significant, and much remains to be done to support rural and agricultural societies become more diverse and accept disabled people. When culture is more diverse, especially in rural communities, and access to technology becomes more affordable and reliable, the novelty of seeing an individual with severe disabilities employed in agricultural production is likely to disappear. The authors have reported that some sort of assistive devices can be used to prevent the disabilities from the secondary injuries. They described about the variety of national programs, workshops and so on which promotes the adoption of assistive devices in future.

Dr S Rajamohan and E. Saranya Devi 2019 have stated about the National Handicapped Finance and Development Corporation (NHFDC). The Ministry of Social Justice and Empowerment has identified NHFDC is one the main concern, by providing grants, handling aid, training and initiatives, etc., the company is supporting the disabled people. The authors outlined schemes and regulations, examined by the government that approved the individuals and specifically stated the amount of borrowers who got a loan each year.

E. Saranya Devi and Dr. S Rajamohan(2019) have stated about the Enterpreneurs with disabilities barriers that are facing in their business environment in a theoretical aspects. The paper stated their issues, problems and challenges faced by the entrepreneurs with impairment.

A.Sathish and S. Rajamohan 2019 have evaluated the contributions made by medium and small scale industries in India. All these industries operate in low cost and they have very high potential for success. The study also clearly stated the role of industrial agencies in economic development and progress of India. The study categorically stated that they play a vital role in removing disparities among various classes of society. The study concluded that there is a need for creating various training centers and provide training & developmental assistance to these entrepreneurs. The study has also evaluated the contributions made by various entrepreneurial

development agencies established by government in improving the standards of living of people through employment and economic development.

Robert bobby Grisso (2014) has explained about assistive technology adapted by the disabled farmers for their agricultural segment and the steps involved in designing an effective AT method. The paper further addresses specific and functional AT systems used in farming and how they impact secondary accidents, and mentions organizations and services that can support farmers and ranchers adopt ATs.

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OBJECTIVE OF THE STUDY

- To analyze the utility of various assistive technology devices for agriculture and allied activities available in the market for the disabled people in USA, Canada, Australia and India.

RESEARCH METHODOLOGY

This study is a descriptive in nature. This study is purely based on secondary data which have been collected from books, journals, magazines, ‘Agrability’ website and selective e-journals and so on.

AID INNOVATIONS WIDELY USED IN AGRICULTURE

The Assistive Technology device encompasses some sort of device, alteration or system to assist a person with an impairment. This may be a costly or low-cost, but it is essentially support someone to do a job that could make possible at least in sometime. Although innovation will make life easier for everybody, aid technology can make sure to do agriculture for people with disabilities possible. Many types of Assistive technology device can be used on ranch. Such supporting technologies may be intended for a disabled person to carry out a work, technology designed for both the general population but of particular importance for individuals with disabilities or technical work activities which can transform the way a job is carried out.

In India, there is an expert for transplanting external organs but can do only when death is confirmed then transplanting their external organs like hand, leg and so on donate to the individual with disability and make them to walk and casual movements of hand. Today this is biggest achievement and expert doctors and physicians rehabilitate the people with impairment. But these facilities is not possible to all for the people with impairment. So the government offering some sort of Assistive Technology devices to the Person with Disability. Technologies for the farming activities for PWD such as Pick bars items with extended handles, pro war-vibration gloves, sole-absorbing boots, remote controls and so on. The disabled agriculturist are using devices based on their requirement such as Horticulture, Poultry, Dairy breeds, Handling AT in livestock, production of crops. The following are the devices used by the disabled agriculturist.

GARDENING AND HORTICULTURE

If someone becomes disabled and cannot enjoy simple hobbies, one way to alleviate some assistive technology device is to make the garden easier to access. Gardening is a very effective form of relaxation if the sore sometimes limited joints of the handicapped person are not stressed. Assistive Technology is used to allow disabled people to sit easily and safely. Some instruments are mentioned below.

Raised bed with wheel chair Gardening: This is a technique of plantation for disability. Raised bed gardens can be very beneficial to a disabled person, not only makes gardening possible, but are also highly therapeutic. It makes them to feel happier and healthier. It may have many purposes such as providing an isolated area in which the disabled person who cannot tend to normal garden can grow flowers, herbs or vegetables or cater. Locomotor disability, vision impairment and old age people cannot walk along hence to fulfill their mobility requirements with a raised bed built to make it accessible to wheelchairs. This raised garden bed is a U-shaped for wheel chair access and easy access to planting areas. Raise gardens bed are suitable for areas cultivate in a poor soiled or where planting is to be encouraged. This can make a major difference because the person is going to have to sit next to the bed and twist his or her body to work in the garden. The bed can be managed to make more available to a user of a wheelchair by placing the bed on top of the legs allowing the user to sit closer to the legs below to their plantation. Raised beds prevent from the pesticides and weeds.

Swivel seats: It may offer a great alternative to wheelchair-accessible vehicles and make the move to and outside standard vehicles easier for both driver and passenger. swivel seat can be used to rotate their seat up to 90degree from the vehicle and helps them for garden access and paving, rolling garden cart seat help to person with disability with limited flexibility access and safety to and around the garden designed by ergo mobility assessment in Bolney, Agrability in Australia and USA is the best seller provides this assistive technology for the PWD. It is a good convenient technology can adopted in their vehicle seat in tractor also. It is available in Indian online market in amazon.

Folding garden kneeling stone: Makes gardening with this kneeler safer; this has a kneeling frame or a comfortable seat or footstool in reversed condition. This green stool has vital arms to help the user stand up again. It assist to gardeners who are in need of help for getting up and down. This device specially designed for movement impairment people and oldage people whom are using the garden. For ease of use, it is made of heavy duty impact resistant plastic with a foam knee pad attached handles. Its size is 63x 25x 24 cm. This device is familiar in UK country.

Wilkinson Sword Folding Kneeler and Seat: It is good for taking the pressure out of gardening, this kneeler is aimed to support to user weight while working in the user garden with a supportive foam cushion on a solid steel frame. The frame is cleverly designed so that when standing up, the legs also act as side handles for additional support. Besides, it can be used as a comfortable seat if the user turns it upside down. It is easy to store and can be folded flat to fit in the shed or garage of the owner. Particularly locomotor disorder people and old age people can access this device.

Pistol grip tools: This grips are intended for less energy and for maintaining alignment of the forearm and wrist. It helps to the person with disability by dig the soil for plantation. The grip is consider as a hand for disabilities. This device is specially designed for the people impairment with hand.

Ergonomic garden tools: The tools are made of large, textured handles, no slip handles to improve grip. And long handle serves as a trigger to drive the users energy to a tool and make to impact more effective so that user can plant for less energy. Long-handled devices are aimed for gardens who have to sit or stand up on a chair due to arthritis or other disabilities to gain additional scope.

HANDLING ASSISTIVE TECHNOLOGY IN LIVESTOCK

There is a risk involved in handling of livestock by disabled people involve in farming activities. The possibility of secondary injury from existing injuries or disabilities during the handling of animals is extremely high. Most Assistive Technologies are used to support and protect disabled farmers from further injury. Such devices help to prevent or reduce direct animal interaction. The majority of these types of assistive technologies are used both in cattle and milk operations.

Livestock guards and Fencing gates: Domestic livestock are prone to predations from different wild and domesticated animals, particularly sheep and goats, hen, dog and so on. The people with impairment is difficult to handle with these animal, so the livestock guards will assist the need to open or close the gates without stopping their vehicle. This fence gate is accessed by swing back system and free from any remote or system access.

All Terrain Vehicle (ATV) : Cattle Guard is setting up in a fence, making an ATV, but not for the cattle. The system has 3 simple separated parts made from 1 inch of a steel tubing to be packed and transported by one person in the bed of a pick-up truck. By these facilities the Person with Disability can easily ride with their vehicle and inspect their domestic animals easily.

General Livestock: Continuous scoop feed bunk cleaner is used by the common people as well as the 'agrability' is specially designed with easy access feed bunk blower is powered by tractor that assist to the disabilities can operate this loader bucket frame has designed to remove estimated 75 percent of snow from crust and or bits of fodder by way of universal mounts. In the Snow fog region this instrument normally serves for protecting the domestic animals. A person with disability can get easy assistance from the U.S. nation.

Feeding Aids and Accessories: People with disabilities face difficulties when they are supposed to handle cattle herds to feed them, particularly locomotor disability category people cannot easy to move that they can use Feed Dispenser Cordless-Drill, electric hot knife, motorized feedcart and so on. By using the feedstar belt gives feed directly to farmer pets – as often as they want, both night and day. The following equipment's are the type of flexibility will help them to highly involve in a dairy breed activities.

- Combination Bale Hauler-Feeder
- Ground-Level Pen Walk-In Feeder
- Overhead Bedding or Roughage Dispensing System
- Weldy Portable Feed Bunk
- Swing-out door feeder
- Elevator grain feeder and so on

All these Assistive technology device helps to easy accessible by the disabled people for feeds their pets. These devices widely manufactured by the Agrability in USA,UK and Australia.

Livestock Healthy Equipment: Automatic syringe is used to treat a large number of animals at one time with vaccinations or medications. When pressed, the syringe grips each shot with a certain dose without re-filling of it on every time. This would be particularly useful for visually impaired growers, as they could give accurate doses without looking at the syringe tube gradients. The following equipment's are the types of help for access the healthcare of Livestock.

- Homemade Mobile Cattle Oiler
- Illuminated Hoof Pick
- Infrared Thermometer Gun
- Livestock Paint-Marking Pistol/Pellet Kit
- Livestock Repeater Syringe
- Long Shot
- Medi-Dart
- Needle-Free Livestock Injection System
- RAU Animal Immobilizer
- Single-Motion Vaccinator and Marker and so on.

All these assistive technology devices used by the disabled farmers accessed for measure and prevent the healthy condition of the live stocks. If a sick livestock may be detected-and handled earlier than this with the Fever-Sensing Ear Tag called the Fever Tag. It looks like an ID tag that

contains a microprocessor of computer which helps to automatically monitor animal's body temperature. It will easily shows to the disabled farmers when their livestock crossed over 130 degree temperature, the tag started to blink and create a little noise automatically. Then the VI farmer can easily identify the sick livestock easily. There are a plenty of assistive technology devices are made in ergonomics for person with disability.

DAIRY BREEDS

The following are specific for dairy activities in addition to certain AT devices listed in the section.

1. Automatic milker for easy milker detachment.
2. Foot milking airlifting tools will help them for getting milk from the cow.
3. Carrier rail to move easily from one milking station to the other.
4. Super mixer for the specialty diet of dairy cattle and so on.

These technological devices assist them for dairy breed activities. The Locomotor Handicapped, Hearing Handicapped, Ortho Handicapped people can easily use this device for their business activities in agricultural and its allied activities. This device is used for automatic milk brewing, making a move easily from one milk station to the other and so on. Many dairy-related support strategies Assistive Technology device include crowd gates, air-operated entrance and exit gates in a farm, electric feed carts, coiled floor matts, and cow surveillance systems also help to assist to the person with disability. The changes make a significant impact in the everyday life of a disabled farmers on the field.

And dairy parlor wheelchair is also used to Locomotor Handicapped farmer who need to roam that they can use the pipe of parlor to pill their chair around which compactly and high enough to allow it from the ground to reach the cows. It is really amazed to involve them into certain activities.

PRODUCTION OF CROPS

Indicators for automatic grain are used for graining the bins. And tractors, crane are used for cultivating paddy, wheats and so on.

Modification of the tractor: Today disabled people can operate the crane, tractor and heavy vehicles for agriculture purposes. There are numerous instances of Assistive Technology implementations and related tractor improvements in order to respond to disabled farmers ' needs.

Spinner Knob: A basic spinner knob on the gear stick can be quite useful in giving better braking power for people with disability to use this prosthetic devices or low grip. Although new tractors only need modest steering power, but the disabilities make it problematic to clutch the typical navigating wheel. To avoid this problem a spinner button can be added to help individuals with a disability to effectively control the tractor.

Specially designed seating arrangements in tractor: People from traumatic brain injuries, particularly those who are wheelchair bound, were assisted by custom seats, air-ride seat tractors and construction equipment, this retrofitted seat is designed to protect operators with some disabilities. The operators are lower-frequency and other potential sources of comforting by means of cushioning, sitting angle, handle bar grips and positioning of the shoulder and elbow. This chair will automatically transit like get in and get down to their wheel chair.

Station of docking: For those living with mobility issues is the docking station to connecting device. Such devices require operators, without leaving their seats, to connect or unplug machines.

When the disabled operators are using the tractors for their production of crops, these facilities will help them to operate easily. Additional steps are applied to the tractor for disabilities can easily get in and get down from the tractor without anyone help. This is the greatest advantage of ergonomic system.

POULTRY

Disabled persons who carried their business in poultry farms are enabled with technology that will assist by auto-reverse device that enables the birds to go outside for a while and indoors protected during the night without anybody having to open or close the access gate of the coop. It is easy for the disabilities. A few technology will help for their business sector such as,

1. Feather picker
2. Incredible egg washer helps to wash the coops egg
3. Poultry catching hook and so on.

In normal people are also using this technique for their business. It is easy to handle and also reduce their working hour.

ASSISTIVE TECHNOLOGY AND SECONDARY INJURIES

Disabled farmers in farm activity are prone to accidental risk and have a chance for secondary injury. Primary injuries can result in vulnerabilities that may result in further injury. For instance a farmer with arthritis, may lose his grip and fall; the fall may causes the secondary injury. With some of these uncertainties in mind, assistive devices are designed to compensate for shortcomings and decrease the risk for more injury. Disabilities and wounds that exist can affect neither time of reaction and skills of motor. Therefore, people with sustained injuries and or person with disability involved in physically demanding and otherwise risky farming operations significantly increase their risk of secondary accidents.

The effect of secondary accidents can be draining to those who are already trying to manage the main accident. The secondary wounds may cause permanent damage in many cases as new accidents affect pre-existing conditions. In other situations, additional recovery time may be required. The impact of secondary injury on the farmer and the farmer's family may be profound.

Most agricultural operations are high-risk. For this reason, the simple approach for people with disabilities and primary injuries to avoid secondary injuries is not to play an active role in farming. This is often not always an acceptable alternative, so the rancher should make an effort to avoid excessive-risk activities. Activities such as livestock handling, heavy-rise work and equipment maintenance are all classified as high-risk operations. If this is not a choice as well, the operator should make every attempt to implement assistive technologies which can reduce the risk of secondary injury. In general, Assistive Technology helps to injured farmers for to continue farming with reduced secondary injury opportunities. It should be remembered, however, that routine use of Assistive Technology results in secondary injuries. These situations often occur when home-made Assistive Technology are used that do not follow design standards, or when commercially available Assistive Technology are used without adequately matching them with the abilities of the consumer. Secondary accidents can also occur when using Assistive Technology without proper training.

UTILITY OF AT DEVICE ACROSS NATIONS

1. In Australia, LD people using modified Chrysler Voyager is a wheel chair friendly vehicle modification. Dr Trust is a portable foldable manual wheelchair for pain relief is used in USA. In Canada, this same device is used as a transport chairs, reclining back wheelchairs.
2. Grab for round bales is a heavy duty equipment for farming activiies commonly used in USA, Australia with the same name. The Agrability market is common in both countries.
3. Fencing gate is commonly used in Canada, USA, Australia, India
4. Heavy hitter post pounder is a heavy vehicle used for ploughing the paddy or wheat in USA and Australia, In India and Canada it is named as Wheatheart commonly used by all non-disabled farmers. The agrability marketer specially designed by lightweight machines for the people with impairment.
5. Powerdeck loading system for pick up is a heavy vehicle specially designed to disabled farmers used in USA (agrability). Tractor access hand winch system is used in Australia (Agrability). Triple L power deck is commonly used all the farmers in canada. Differently abled people can use this technology. In India heavy vehicle is used to all common people for agricultural activities.
6. Additional seat for easy quad transfer technology used in USA and Australia. All terrain Vehicle is adapted this additional seat for easy quad transfer technology in Canada.
7. Easy use irrigation system device used in USA, Australia commonly for disabled farmers.
8. Modified Ferris Zero Turn Mower is used in USA, Canada, Australia and India. It helps to mowing grass in farm land.
9. Pool access winch is used in Australia, USA and Canada. It helps for LD, arthritis type of disabled people.
10. Transportable hydraulic hoist is access tractor used in USA, Australia, and Canada. The disability can use this technology for their farming activities.

CONCLUSION

Involvement of disabled people in agriculture paves a way for India's inclusive economic growth. Irrespective of general beliefs that age old people and disabled people in hardly can engage in agriculture and allied activities, they can perform better in that sector with the help of profound adoption and application of assistive devices in their day- to-day regular activities. Right selection and adoption of available assistive technologies applied across the agriculture communities worldwide will make them able handed in performing their agriculture occupation in India. The existing shortfall in the technology adoption could be met through effective awareness programme, propaganda, media advertisement and supporting role of the government, specialized organization, NGO and others. It would help for the overall development of the disabled people engaged in agriculture and allied activities and for the equitable development of the society. Technology will improve the efficiency and effectiveness of their performance in their working field. Ultimately, it would contributes for the human development of the nation.

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