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Management of Weeds and Sustainable Technique

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It is imperative that Field Assistants can provide farmers with weed management extension services. This study evaluated the weed control skills of Field Assistants from Khyber Pakhtunkhwa's Agriculture Extension Department. Interviews were conducted with 234 randomly selected Field Assistants to match the study's objectives. Weeds management skills at the possessed level included familiarity with the names of common weeds, the capacity to recognize different types of weeds, and an understanding of indirect weed control methods. Training for Field Assistants in biological weed control familiarity was followed by a critical threshold level of weeds and the key period of weed competition. Ranking Based Quotient results found that the most common barriers to developing important skills were lack of development, training opportunities, and incentives or motivation. Consequently, field assistants must be given practical in-service training in specific locations to acquire the requisite weed management skills. These hurdles must be removed for Field Assistants to learn the necessary skills for weed management and aid the farming community in their endeavors.

Keywords: Training standards, interview schedules, and weed control.

Introduction

An agricultural extension can be characterized as "a continual process of providing farmers with meaningful information and aiding them in acquiring the knowledge, skills, and attitudes required to effectively employ information and technology to boost productivity"[1][2]. Farming communities in underdeveloped countries rely heavily on agricultural extension workers, who must be well-versed in agricultural practices in order to assist them [3][4]. Competency is (2002)[5] as possessing the abilities, and attitudes required of extension agents in order to carry out their duties. The capacity of program extension workers to fulfill their goals is entirely dependent on their degree of competence, knowledge, and attitude [6].

Agriculture extension services rely heavily on Field Assistants (FA). An Agriculture Officer (AO) is in charge of them at the circle level [7][8]. A nation's social and economic progress depends on the work of people like Field Assistants. Field assistants use a self-help method to help farmers recognize their own problems and find solutions[9]. Agriculturists seek their advice on crop protection, and they also plan demonstration plots and other agricultural events.

Weeds are plants that are undesirable in a particular location and whose removal provides social, aesthetic, economic, and therapeutic advantages to humans. These undesirable plants harm crops by invading them and decreasing their yield. A study showed that weeds can hinder crop growth [10][11]. This type of conflict is sometimes difficult since weeds and agricultural plants compete for space that would otherwise be open to both. Plant growth is inhibited when this space is reduced. It is more economical to control weeds than insects, fungi, or any other type of pest [11], [12]. When it comes to cereals like rice and wheat, undesired plants significantly impact yield, even though they account for more than 80 percent of the total grain produced worldwide [13]. In reality, pest-related losses have the following root causes, according to [14]: An estimated 20 to 45 percent of all infestations are caused by diseases, insects, and various kinds of dangerous weeds, which many farmers are unable to recognize and control at the correct stage and timing.

It has been suggested that agriculture officials should receive more training in the area of weed management research [15] stated that farmers could control and manage weeds if extension agents were well-versed in weed management. Agricultural extension agents in Pakistan are completely reliant on them because the majority of the country's rural community, particularly in Khyber Pakhtunkhwa, is uneducated and has limited access to newspapers, research articles, and other agricultural journals. As weed control is critical in crop production, the goal of this study was to establish the level of competency required and already possessed by Field Assistants in relation to weed management, as well as their training needs and barriers [16][17].

Results

Integrated weed management is the use of many different ways to get rid of weeds in a way that works well together. This makes it less likely that herbicides will be used and makes it more likely that the weeds will be controlled or gone. Integrated weed management programs need to plan for the long term, know the biology and ecology of weeds, and know how to get rid of weeds in the right way. Weeds are kept in check and the number of them is cut down by using a plant's natural enemies, like insects, mites, and diseases. It's cheap, works well, and is good for the environment, but it takes a long time to set up and a long time to grow. Biocontrol doesn't get rid of weeds, but it can cut them down to a manageable size or keep them from growing so much that they can't be controlled in other ways.

Mycoherbicides are plant pathogens like rust and fungi that kill weeds. They are used as a treatment for the biological control of invasive plants. They are like natural herbicides

that only kill certain types of plants. They don't have their own place to live, and they only work for a short time. In traditional biological control, weed-killing agents like insects, rusts, and mites are set up in an area where weeds are growing. This creates a natural balance between the weed and the thing that kills it, just like what you would find in the area where the weed is from.

If an agent starts a population, control is no longer needed because the agent is now part of the ecology of the area. Keeping track of how the population of an agent changes over time is a key part of a biocontrol strategy. If a pesticide has worked well in other places, it might be time to try biological control. But programs might not work for more than 10 years, and the results might be different in different places. Biological control is useful and effective in places that are hard to reach, like wooded, rocky, or steep areas; places that don't need to be controlled right away; places where biocontrol is the only option, like in sensitive water areas; and places where chemical control may be too expensive or not work.

Flaming is not a common or well-developed way to get rid of weeds in Australia, but it has been used in Sweden for many decades to get rid of weeds on organic farms, in carrots and other slow-germinating row crops before they sprout, in heat-tolerant crops after they sprout, and on hard surfaces in cities to get rid of weeds in general. Both liquefied petroleum gas and propane can be used in flame weeders. For the process to work, you don't have to burn a weed. Instead, the cell membranes of the plant are destroyed by heating its water above 100°C.

Small seedlings are more likely to catch fire most of the time. Plants that grow high and have thin leaves are more vulnerable than plants that grow low and have protected growth points. A new way to get rid of weeds is to steam them. This method is still being worked on. When hot water is poured on a weed, it loses its waxy coating, loses water, dries out, and dies. It also loses its waxy coating. For the system to work, water is forced through a heated chamber under pressure and then put on the weed. The heat and pressure of the water break down the structure of the cells, causing them to change color and die within hours or over a few days.

Field tests in New Zealand showed that steaming kills annual weeds in just one day. Some perennials' leaves also fall off within 24 hours, but within a week or two, new growth comes up from the roots. The equipment has been tried out in Australian cities, but the results have been mixed. In different places, test work and evaluations are still being done. Using goats to get rid of weeds is a long-term or medium-term plan that can work well in some cases. When goats are raised with sheep, cattle, or crops, they can help get rid of weeds and make pastures better. In general, goats should not be the only part of a plan to get rid of weeds. Stocking rates, timing, how tasty the weeds are, and how to run a farm are all things to think about. Usually, to fill in empty spaces, it's important to have a competitive pasture.

Goats that only eat the leaves, bark, stems, and flowers of weeds keep them under control. Goats eat weeds that sheep and cattle avoid, like blackberry, sweet briar, scotch broom, thistles, Paterson's curse, and horehound. Some of these animals are very good for you to eat. Goats will occasionally eat things like fireweed, groundsel bush, St. John's wort, serrated tussock, and spear grass. Goats eat weeds in hard-to-reach places where other ways of getting rid of them can't be used.

Herbicides are often used to get rid of weeds in farms, businesses, and homes. Herbicides are chemicals that kill plants by messing up their enzyme systems, stopping them from growing, replacing their hormones, or stopping their chemical reactions. Herbicides

work well and can be used in a lot of different ways. They are often the best way to get rid of weeds for the least amount of money. Some herbicides kill plants as soon as they touch them, while others have to go through the plant's system first.

Contact herbicides kill the parts of plants that they touch, which are usually just the leaves and stems. They work best on weeds that keep coming back or on the seeds of weeds that keep coming back. Contact herbicides can either be selective, which means they only kill broadleaf plants, or they can be non-selective (i.e. they kill all plants). For contact herbicides to work, they have to be put on plants that are growing, and they have to cover a lot of ground. Contact herbicides include paraquat and diquat.

Herbicides that move through a plant's system need to be moved. They stop things from growing and mess up the way that biochemistry works. This usually happens at the base of grass stems and at the growing tips or buds of broadleaf weeds, where cells are actively dividing. Herbicides like glyphosate and metsulfuron-methyl can move from one place to another.

The Pesticides Act of 1999 (NSW) says that herbicides, labels, and containers must be registered. Following the directions on the label of a registered herbicide is the only way to get rid of weeds. Labels are there to stop people from using a product in the wrong way, and by law, people have to read and follow the directions on them.

Herbicides might hurt the health of people, animals, and the environment. People who know what they are doing can avoid getting sick by following the directions on the product label. Some of the tools used to apply herbicides are boom sprayers, handguns, knapsacks, wick-wipers, granular applicators, aerial sprayers, and gas guns. You can spray it on the leaves, put it on the base bark or a cut stump, inject it into the stem, or wipe it on with a wick.

The choice of equipment and method of application depends on the size of the weed problem, the type and sensitivity of the weed, the terrain, how easy it is to get to, and the possible health and environmental risks. Herbicide treatments must take into account the weather, the soil, and when the treatment is done to be safe and effective. During treatments, it's important to check and keep an eye on the weather to reduce the chance of drift and damage to other areas. If it rains hard after the application, it might not work as well and the runoff could pollute waterways.

Cultivation Getting rid of weeds by killing them has been shown to work. It works best on weeds when they are young. Weeds are dug up and killed with tools like large tractors, discs, plows, mattocks, and chip hoes that are used by hand. Shoots can be cut off at their roots or buried deep to stop them from growing back, and the roots can be pulled up to the surface to dry out. Some weeds can be killed by going over them over and over again. Perennial weeds, on the other hand, can be hard to get rid of because they have deep roots.

Weeds are easier to grow if they are tended to before they flower and when it is mostly dry. Manual cultivation is a good way to get rid of weeds in small areas or as a second round of control. You can slash with a tractor and a slasher, or you can use a brush-cutter and do it by hand. It costs less than farming and keeps the ground covered, which stops soil erosion and lets people get to their homes when it rains. Continuous slashing might help get rid of weeds if there is a good pasture plant nearby that can grow in its place. But slashing won't kill weeds and can't be used to keep weeds from growing in crops.

By cutting them, tall weeds won't be able to flower and send out seeds. After selective grazing, it can also get rid of weeds that animals don't like or can't eat. A controlled burn is the best way to get rid of woody weeds. This is different from a wildfire because it only burns the area you want it to. Using herbicides or machines to clear the land is more expensive than doing it directly. A controlled burn: • hurts the environment less; keeps property and animals safe; clears the land so it can be used for pasture; makes it easier to get to weeds and kill them.

Reforestation is a long-term way to get rid of weeds by growing a dense tree canopy that blocks the sun from reaching the weeds on the forest floor. For reforestation, you can either plant trees that grow naturally in the area or make plantation forests. A program to get rid of weeds can use agro-forestry, which means growing trees along with other farming activities, like growing crops or keeping animals. Replanting trees is a good way to get rid of weeds in large areas where other ways are too expensive or not possible.

Mature trees compete for water, nutrients, and sunlight, and they also make it harder for weeds to grow and spread. A dense tree canopy can take 5 to 10 years to form, so it's important to get rid of weeds in other ways during this time. Weeds can also be kept in check by planting grass or legumes that grow well in shade and compete with weeds.

Good land management is needed to get rid of weeds and make those that remain less dangerous. The costs of weed control go down, which makes up for the higher costs that come with better land management at first. Keeping pastures or desirable ground covers in good shape, reducing disturbances and tillage, controlling the flow of nutrients, managing grazing, spotting weeds early, and keeping weeds clean are all ways to deal with weed problems.

Weeds can be kept in check by having pastures that animals want to go to. Stocking rates must be kept in check so that areas don't get overgrazed and let weeds grow. When the grass is strong, it is harder to get rid of weeds, and a strong pasture makes more food. Weeds can be kept in check in a pasture by making the grass better or by replacing it with a species that is better suited or more competitive. Adding fertilizers and lime to pastures based on the results of a soil test can help them grow better. Crop rotations can help control weeds, diseases, and insects, improve the soil's fertility and structure, and lead to bigger harvests. By changing what you grow, you can stop the seeds of weeds from germinating and growing.

Weed hygiene means planting only weed-free seeds, cleaning equipment, and vehicles, checking clothing and equipment for weed seeds or pieces of weeds, and getting rid of places where weeds can grow back around a control site. When adding new animals to a property, they should be kept in quarantine for a few days so that any weed seeds they might have can pass through their bodies into a known area and be treated later. It is easier to get rid of weeds when they are found early on in their growth. If you get rid of weeds early, it will cost less than if you wait until they have grown and spread.

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