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Assessment of performance of different weeding tools in cultivation of maize in Koshi region

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Abstract

Keeping in view of hazardous effect of herbicides a trial has been conducted to assess the performance of some specific weeding implements in rabi maize cultivation by KVK, Saharsa in two consecutive years 2017-18 and 2018-19. Different crop specific weeding implements had been kept under trial from time to time in rice, soybean and vegetable crops and it had been found that application of a weeding tool for interculturing and weeding operation also provided better aeration to crop roots, enhanced organic contents of the cultivable area along with combating the hazardous situation due to application of herbicides. A twin wheel hoe and a grubber have been kept under assessment with the use of a spade, a common tool for interculturing operation among farming communities. The field capacity of the twin wheel hoe has found the highest among the implements under trial. The B:C ratio (2.35) and the yield (95.7 q/ha) have also been observed the highest in the plots where the twin wheel hoe has been applied for the purpose.

Keywords: twin wheel hoe, grubber, weed control efficiency, field capacity and benefit cost ratio

Introduction

Weed management is a big challenge in agriculture and in many cases a complex, controversial and expensive problem to resolve. There is huge amount of weeds infestation in crop fields in the catchment area of river Koshi because of a heavy seed bank in soil deposited by the river with flood during rainy season. Herbicide, like wise generally known as weedicide, is concoction substances used to control weeds. There are various sorts of weedicide, which can all be perilous to people or the soil if utilized recklessly. Chemical and inorganic weedicides may cause hurt by intensive harming or long haul, aggregate exposure, with symptoms going from gentle to fatal. These weedicides may cause respiratory damage whenever breathed in and very harmful for human beings as well as animals. Keeping in view of the harmful effect of herbicides some weeding tools have been kept under trial in the cultivation of maize, which is a prominent crop of Koshi region. Use of spade is very common for inter culture operations in crops and its operation requires hard physical work that diverts farming communities for easy option towards application of herbicides in their cultivation practices.

Keeping these points in view a trial has been arranged to assess the application of two weeding tools with following objectives:

- i) To observe the weed control efficiency of tools under trial
- ii) To measure the effect on yield attributing characters and yield with application of tools under trial

Yadav *et al.* (2007) ^[1] observed that mechanical weed control not only uprooted the weeds between the crop rows but also kept the soil surface loose, ensured better soil aeration and water intake capacity. A study has been made on weed management in aerobic rice by Raj Kumar (2008) ^[2] has reported on weed morphology and stage of growth would influenced the selection and efficacy of weeding implements. It is found that the physical damage by burial to one centimeter depth is effective for controlling of weeds followed by cutting at the soil surface. Gore *et al.* (2010) ^[3] reported that cycle hoe weeder produced significantly the highest grain yield and found to be effective in controlling of grass as well as broad leaved weeds

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(69% and 44%) and (63% and 67%) at 30 DAS and 60 DAS in soybean. Tilman (2016) ^[4] reported the several methods of weed management already existed that farmers could adopt in combination to eventually withdraw altogether from pesticides use. According to him even complex issue, like use of glyphosate in conservation tillage to avoid ploughing and to protect the carbon –storage capacity of agricultural soils, could be resolved without herbicides use.

A twin wheel hoe made by CIAE, Bhopal and a grubber made at KVK, Saharsa have been kept under trial in the cultivation of rabi maize against the use of spade that is the common

practice among farming communities. The trial has been conducted in two consecutive years of rabi season 2017-18 and 2018-19 at ten farmers' fields at different places in Saharsa district with RBD design. The crop has been established in the first week of November and harvested in the third week of May next year. The growing of high breed seeds is the common practice among maize growers in the locality; therefore, P-3522 has been selected for the purpose. The implements under the trial have been operated after 20 DAS and 40 DAS (days after sowing).

Table: Assessment of weeding tools in cultivation of rabi maize

Weeding Tools	WCE (%)	FC (m ² /hr)	No. of grain per cob	Yield (q/ha)	Cost of Cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B: C Ratio
spade	74.2	98.57	332	88.2	54,071	1,10,250	56,179	2.04
Twin wheel hoe	85.9	114.29	348	95.7	50,904	1,19,625	68,721	2.35
Grubber	79.3	108.24	337	92.3	51,738	1,15,375	63,637	2.23
SE _m	0.1437	0.4856	0.8431	1.3649				
CD at 5%	0.3693	1.2722	2.1836	3.6170				

WCE - Weed Control Efficiency, FC - Field Capacity

It has been observed that the field efficiency as well as field capacity of a twin wheel hoe has found highest among the implements under trial, therefore, the most suitable weeding tool in the maize fields. Due to effective weed control in the plots by the twin wheel hoe, there has been observed that the yield of the crop has been increase by 8.5 per cent with respect to the plots where a spade has been applied for the purpose and by 3.6 per cent with respect to the plots where a grubber has been utilized. It is due to more weed free environment in the plots, conversion of weeds into organic content and more availability of root aeration in the plots.

Therefore, a twin wheel hoe may be the best option for combating weeding problem in maize fields in Koshi region.

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