Disease Surveillance of Vegetables Crops and Farmer's Disease Management Practice in Bhaktapur District, Nepal

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ABSTRACT

This study is conducted in Bhaktapur district, the smallest district of the Nepal from 9th march to 20th may 2020. Altogether 100 respondents were selected for collection of data and information. Out of 100, the survey showed that the male farmers respondent were higher as compared to female respondents in the districtsand are the age group between 35-50 years age groups werehighly engaged in vegetable farming. Through the survey, It is found that Majority of farmers of Bhaktapur district was dominated by the Newar caste followed by Brahmin and chetri caste. Agriculture was the major occupation in the Districts. Around 80% people are engaged in Agriculture occupation with average land holding was 0.05-0.25 ha. It is found that 80% of the farmers were selling vegetables through the Middle man and rest of people selled on the local markey. In the district most of the farmer has a problem with the disease as disease is the most severe problem in vegetable production. It is found that Alternaria leaf spot, club root, black rot and downey mildew were the major disease problem in cauliflower on the surveyed area. Similarly In case of okra, yellow vein mosaic, powdery mildew were the major diseases. In case of chili, the major diseases were damping off and anthracnose. In case of tomato, majordisease was damping off, septoria leaf spot, early blight, bacterial blight, TMV, fusarium wilt.In the surveyed area Most of the farmers (65%) were using chemical plus cultural, 12% were using biological plus chemical and (20%) were using chemical pesticides diseases management in the district.

Key words: Diseases, Vegetable crops, TMV, Pesticides

Introduction

Nepal is a small, diverse and landlocked country lies between the two big economies of the world china and India. Nepal has three distinct physiographic regions namely Terai, hills and mountain with high climatic variation. It is highly dominated by the hills.Bhaktapur, a smallest distric with 119 km^2 area of Nepal, Mostly people engaged around 80% people directly engaged in Agriculture as the major source of income. The contribution of agriculture sector to the national GDP is 33.1 Percent (MoAD 2014). The composition of GDP as 49.41 Percent from cereals, 25.68 from the livestock, 9.71 Percent from vegetable and 7.04 Percent from fruit and spices (MoAD, 2014).

Vegetables play an important role in the Nepalese economy as vegetable is highly consumeable and perishable with a high nutritin. It occupies an area of 266937 ha with the total production of 3580085 MT and total yield is 13412kg/ha in the year 2014/ 2015 (VDD, 2015). Vegetable farming is one of the major enterprises and source of income of marginal people of Nepal. There are 3.2 million vegetable holdings that accounts to about 69 percent of the total households. The vegetable sector contributes more than Rs.36 billion of value in the country, with cauliflower, tomato and cabbage as the lead contributors with values of Rs.4.9 billion, Rs.4.4 billion and 2.8 billion respectively (CBS, 2010). Vegetable plays a vital role in the food front,as well as the source of income of the marginal people. It will help in the uplift of the livelihood or the marginal farmers as it needs a less land holding.Vegetable also help in the diatery food to the people as it contributing carbohydrate, vitamins and mineral salts in the human diet, which are very essential for maintaining a good health. Vegetables play a important role in the human life and source of income as the vegetable is consume daily with rice (vaat and tarkari). The plant diseases morely associated with agriculture as in every vegetables, there being a problem of the disease. To control the disease, a number of actions against the disasepathogen were adopted over time, such as cultural, chemical and biological approaches. Disease isimportant pathogen agent thatnegetavly effects or interrupts the structure and function of vegetables causing the loss of vegetables or low yielding as well as production of abnormal vegetables which make it unmarketable.

Materials and Methods

The survey was conducted in the Bhaktapur district. The total duration of the study was 2 months from march 2020 to May 2017. Altogether 100 respondents were selected to complete the study. The informative data were collected through the Household survey with structured questionnaire, interviewing the farmers and field observation. For secondary or supplementary information, many concerned organizations such as (PMAMP) of the potato zone, Nepal Agricultural Research Council (NARC), Ministry of Agriculture Development (MoAD), Plant Protection Directorate (PPD), Vegetable Development Directorate (VDD), Central Bureau of Statistics (CBS), (AICC), and for secondary data different websites of the related field were also searched. The information collected from the survey were entered in Microsoft excel and Descriptive statistics like mean, percentage, Bar diagram and frequency are analysis and the analyzed data will then present in tables, graphs.

Results and Discussion

Disease of vegetable crops (chilli, okra, cauliflower, tomato)

A disease is a abnormal physiological process that disrupts the plant's normal structure, growth, function, or other activities by the biotic agent like bacteria, fungus and virus. Disease are the one of the major serious problem of the yield loss in vegetables. As the Disease was found in the survey site on the selected vegetables. As per Survey, most of farmer has a problem with most common disease of cauliflower is *Alternaria* leaf spot, club root occur frequently whereas black rot also found mostly as compare to Downey mildew disease. Similarly with the Okra farmers, yellow vein mosaic and Die back occur frequently and Powdery Mildew, Leaf Blight found less. It is seemed that Chili is highly Susceptible by the Damping Off and Anthracnose occur frequently. Trought the survey it is found that, Tomato are a susceptible by the different disease, such as Damping off, septoria leaf spot, early blight, bacterial wilt, tomato mosaic virus. Farmer noticed that Blight and damping off are the highly occur as compare to other disease (Table 1).

Management practices of disease

A variety of disease management practices were adopted by the farmers such as cultural, chemical and other mixed methods in survey area. In survey area, majority of the commercial vegetables growers i.e. 65% farmers apply only cultural plus chemical and very miner (20%) vegetables grower farmers used chemicals methods for disease management. Similarly, 12 % of vegetables growers apply integrated biological with chemical measures. (Figure 1)

Pesticide use by the farmers

During the survey and the analysis of the data It was found that most of the farmers adopt cultural as well as frequent used of chemical pesticides available in agro-vet for disease management. Most of the farmer preferred to use chemical fungicides with less knowledge regards to infected disease and the pesticide used. The frequency of application of pesticides is based on the severity of disease. Farmers sprays pesticides ranged from medium toxic to moderate toxic that provided by the agro-vets and the commonly used pesticides by the farmers in the survey area are DM-45 (Mancozeb) which was the highest (46%) followed by kingmill 72% WP (Metalxyl + Mancozeb) which is mixed type fungicides.

Conclusion

IDM is a new holistic approach to control the disease that is particularly suited to poor farmers as it is ecologically safe and cheapest approach. As well as enforced the production of the vegetables with the highly safe food. Now a days the IDM is becoming more popular and some of the farmer were adopting the approaches as it seems successful and popular program in Nepal.

It is found that the use of chemical pesticides withless knowledge of hazardness regards to the used of pesticides was accounted in surveyed area majorly the commercialized farmers and higher land holding farmers.Through the survey it was found that the vegetables grower had a major disease pathogen problem and the area was suffered from different disease pathogen causing a huge loss in production. However; effective control was not gained through the frequent application of chemical fertilizer. The farmers had poor knowledge about pesticides use and its chemical residue on the vegetables. However, they are contineosly using the chemical fertilizer without the prescription of the agricultural technician and no any guidline of application methods. In the surveyed area it also found that, the conventional method of control of pest are slowly decreasing,which are also one of the effective method to control the pest. If recent advances mainly through the changes in agriculture with the heavy use of agro-chemicals are allowed to continue in these alarming areas, which may result hazardous problem in agriculture, health and environment in future.

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Table 1: Disease of vegetable crops (onion, okra, French bean, and chili)

Name of crops	Disease	occurrence		
Chilli (*Capsicum frutescens*)	Damping off (*Phytopthora sp. Phythium sp.*)	√		
	Anthracnose (*Collectotrichum capsici*)	√		
	Bacterial blight (*Xanthomonas campestris*)		√	
	Powdery mildew (*Laveillula sp*.)		√	
	Bacterial wilt (*Pseudomonas solancearum*)		√	
Okra (*Abelmoschuss esculentus*)	Yellow vein mosaic (virus)	√		
	Powdery mildew (*Erysiphe cichoraceum*)		√	
	Leaf blight (*Rhizotonia solani*)		√	
	Die back (*Collectotrichum capsici*)	√		
Cauliflower (*Brassica oleracea var. botrytis*)	Alternaria leaf sopt (*Altenaria brassicae*)	√		
	Club root (*Plasmodiophora brassicae*)	√		
	Black rot (*Bacterium xanthomonas*)		√	
	Downey mildew (*Hyaloperonospora parasitica*)			√
Tomato (*Solanum esculentum*)	Damping off (*Phytopthora sp. Phythium sp.*)	√		
	Septoriai leaf spot (*Septoria lycopersici*)		√	
	Early blight (*Altenaria solani*)	√		
	Bacterial wilt (*Ralstonia solanacearum*)			√
	Tomato mosaic virus (TMV)		√	
	Fusarium wilt (*Fusarium oxysporum*)		√	

Note: Occurrence: high=60%, medium=30% low =10%,

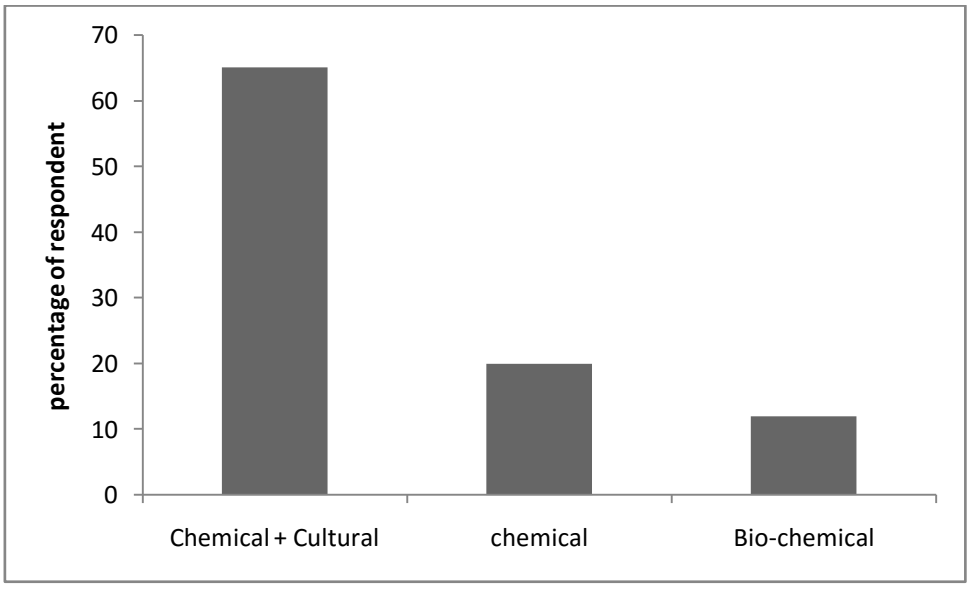

Figure 1: Management practices of insect pest and disease in Bhaktapur districts

Table no 2: Major chemicals used by farmers in Bhaktapur

Trade name	Common name	formulation	Type	Label	Percent use
All kryloxyl, kingmill 72% wp	Metalxyl + Mancozeb	(8+64%) WP	Contact + systematic fungcide	Blue	24%
All M-45, DM-45	Mancozeb	75%WP	Contact fungicide	Green	46%
Bavistin	Carbendazim	50% WP	Systemic fungicide	Green	19%
Karathane	Dinocap	48% EC	Contact fungicide	Green	7%
Surya safe, Sixer	Carbendazim + Mancozeb	12+63% WP	Contact + systemic fungicide	Green	4%
Agrimycine 17	Oxytetracycline hydrochloride		Bacteriacides		47%
Sanjeevni, trichoderma, bhomika	Trichoderma viridi	1.0%WP	Bio fungicide	Green	8%