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A Study on Effect of Climate Change on Vegetable Production Technology in Ujjain Block of Ujjain District (M.P.)

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Abstract: Climate change is a statistical variation in properties of the climate system that include in global temperature, rainfall, sunlight, precipitation etc. Agriculture production depends on environmental, varietal and management factors. Climate plays a major role as its positive and negative impact immediately influences crop productivity. Improved and sustainable agriculture technology according to forecast based, agro advisories and full information about factor effecting of climate change are more useful to reduce vulnerability and improve adoptability of agriculture to climate change. In Ujjain district of Madhya Pradesh major vegetable crops grown are Tomato, Okra, Sponge gourd, Bottle Gourd, Brinjal, Chili, Cucurbits etc. In vegetable growing areas of Ujjain, many factor are available which directly connected with climate change and like average temperature increase, change in rainfall amount and pattern, change in climatic variability. This study conducted in Ujjain District of M.P with 120 vegetable growers. Major finding of the study is maximum percentage (37.50%) of vegetable growers adopted Pulses-Potato-Colocasia vegetable pattern. This vegetable pattern replaced old vegetable pattern of Okra- Garlic- Onion in vegetable production due to climate change.
Keywords- Climate Change, Vegetable Production Technology, Mitigate the effect of Climate Change

Introduction

Vegetables play a vital role in the maintenance of human health. For a well-balanced diet, about 300 gram vegetables are required containing root vegetable, green vegetables and others vegetables, but only 130 grams per capita is available. According to the ministry's estimates, based on information provided by the States and Union Territories, the production of vegetables is estimated to be around 175 mt. IFAD (2009) has reported that climate change is expected to put 49 million additional people at risk of hunger by 2020, and 132 million by 2050 (Devendra 2012).

Climate change has an adverse impact on productivity and quality besides aggravate the environmental stress on vegetable crops. Environmental stresses like increasing temperature, reduced irrigation water availability, flooding and salinity are thought to be the major limiting factors in enhancing vegetable productivity. Though the climate varies are beyond human control, its intensity and extreme impact of environmental stress on vegetable crops can be reduced to some extent and

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enhance the production as well, if the integrated approaches like cultural management practices including nutrient and tillage residue management, water management, mulching, improved pest management, and breeding approaches are adopted.

Objective

To determine the major cropping mechanism adopted by vegetable growers to mitigate the effect of climate change.

Review of Literature

Major cropping mechanism adopted by the farmer to mitigate the effect of climate change:

Shrivastava et al. (2007) found that organic farming is becoming a major tool for sustaining the soil quality degraded by intensive use of synthetic chemicals for increasing crop production and therefore, use of bio-agents asbiofertilizer or biopesticide is an integral part organic farming especially in vegetable cultivation. In vegetable based cropping system use many microbial inoculants and organic farming practices. Three crop taken in rotation were okra, pea and cow pea in a year. Under crop management practices, inoculated bio agent and crop residues increased the yield of vegetable.

Singh et al. (2008) conclude that Rice-wheat cropping system involving potato, vegetable peas and groundnut and water management treatments in rice to increase the production, economics and water use efficiency. Inclusion of potato, vegetable peas and groundnut in rice-wheat cropping system increased the production, economics and land use efficiency on an average by 95, 75 and 11% respectively. Rice equivalent yield was maximum in rice-groundnut-potato-wheat, which was at par with rice-potato-wheat followed by rice-vegetable peas-wheat as against traditional rice-wheat system.

Kumar et al. 2009. Studied that five cropping sequences considering the off-seasonality of 2 months were selected for evaluation. The cropping sequence of squash-french-bean-tomato-spinach gave highest economic yield with production efficiency followed by capsicum-tomato-spinach. Pooled analysis of two years data showed higher gross returns in cropping sequence of squash-frenchbean-tomato-squash, whereas highest net returns However, highest B:C ratio of 3.14 was obtained for cropping sequence of capsicum-tomato-spinach. Lowest net returns andB:C ratio (1.34) were recorded in cropping sequence of tomato-cucumber-frenchbean-coriander.

Prakash (2014) found that potato based five cropping system, viz rice-potato-wheat, maize-potato, blackgram-potato-cowpea and cowpea-potato-okra were tested during 2010-11 to 2012-13 at Kanpur, India. The highest total productivity was obtained under cowpea-potato-okra cropping system, while blackgram-potato-greengram system gave the highest potato equivalent yield with maximum net return and benefit- cost ratio.

Methodology:

For fulfilment of the objective, the study was conducted in Ujjain district. Out of six blocks of district, Ujjain block was purposively selected for study. The study was conducted in six villages where the maximum farmer are vegetable growers has been popularized among the vegetable growers by NHM Ujjain. After the selection of villages, a village wise list of farmers of six selected villages have been prepared. From this list 120 farmers have been selected proportionately for the present study.

Result & Discussion

Major cropping mechanism adopted by vegetable growers to mitigate the effect of climate change:

Farmers were asked about changes performed by them due to various changing or adverse climatic factors. Adoption of new crops by farmers by replacing the old crop (grown 5 years ago) to reduce the effect. The Table 4.18 shows the frequency of respondents who adopt new crop in place of old crop to mitigate the effect of climate change on their vegetable production.

S. No.	Season	Old crops	Frequency	Replaced by	Frequency
1.	**Kharif**	Okra	36	Pulses	38
2.		Cucumber	23	Brinjal	22
3.		Tomato	32	Soybean	36
4.		Bittergourd	29	Maize	24
1.	**Rabi**	Garlic	36	Potao	36
2.		Spinach	18	Wheat	33
3.		Pea	32	Tomato	23
4.		Cabbage	34	Pea	28

1.	**Summer**	Onion	34	Colocasia	16
2.		Tomato	37	Green gram	24
3.		Chilli	31	Cow pea	38
4.		Cucumber	18	Musk melon	42

Distribution of respondents who adopted the new cropping mechanism to mitigate the effect of

S No.	Old vegetables pattern (5 year ago)	New vegetable pattern (present)	Frequency	Percentage
1.	Okra- Garlic- Onion	Pulses-Potato-Colocasia	45	37.50
2.	Cucumber- Pea- Tomato	Brinjal-Tomato-Green gram	40	33.33
3.	Tomato-Spinach-Chilli	Soybean-Wheat-Cowpea	35	29.16
	Total		**120**	**100**

Climate change:

Majority of 37.50 per cent farmers shifted to new cropping pattern Pulses-Potato-Colocasia followed by 33.33 per cent who shifted to Brinjal-Tomato-Green gram and 29.16 per cent shifted to new cropping pattern Soybean-Wheat-Cowpea from the old vegetable cropping pattern due to climate change.

Conclusion-

In case of adoption of the new cropping mechanism majority of farmers shifted to new cropping mechanism Pulses-Potato-Colocasia followed by respondents who shifted to Brinjal-Tomato-Green gram and Soybean-Wheat-Cowpea from the old vegetable pattern due to climate change.

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