



# Identification of Factors Responsible for Shifts in Cropping Pattern

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

The present study was purposively conducted in Khed tehsil of Pune district. Considering the impact of industrialization, 15 villages and 150 respondents from western and southern part of Khed tehsil were purposively selected. The results of the study revealed that physical, biological, resource related, and economic factors had dominant role in change in cropping pattern. Among physical factors almost (92.67 per cent) of the respondents stated that change in the crops is due to "variation in temperature and humidity" and "change in rainfall pattern". Majority of the respondents (96.67 per cent) changed the crops due to resource related factors such as "more irrigation requirement. Among biological factors almost (88.67 per cent) of the respondents changed the crops because of "reduced yield due to pest and disease attack" followed by "more pest and disease incidence" (86.67 per cent). Among social factors the majority of respondents (90.00 per cent) changed crop due to market price. Most farmers (71.33 per cent) changed cropping pattern due to legislative and administrative policies, followed by price maximization of MSP and FRP (52.00 per cent).

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Amongst all the factors under study, biological factors (87.67 per cent) ranked first while physical factors (73.07 per cent) ranked second as the main reasons for shifts in cropping pattern.

*Keywords: Biological factors; cropping pattern; agricultural technologies; rainfall.*

## 1. INTRODUCTION

In India, agriculture and other agro-based sectors are having largest source of livelihoods in India. Nearly 70.00 per cent rural households depend on agriculture [1]. The proportion of area under various crops at a point of as it changes over space and time is called cropping pattern. The study of cropping pattern is essential because it provide evidences about the changes that are taking place in land use related to agriculture. The cropping pattern studied on two basis 1) Shifts 2) Deviations. Shift in cropping pattern means change in sequence of crops over a period of time. Deviations in cropping pattern mean change in area allocated under different crops [2]. Agriculture is multidimensional in nature. As new, modern agricultural technologies introduced in agriculture, continuous change in cropping patterns has been seen primarily due to some factors behind that such as factors covers resources like fertility of soil, irrigation of crops, rainfall received, Technological factors like application methods of fertilizer, seed sowing and irrigation methods, post-harvest handling ,Household aspects including sufficiency of food, fodder and investment by household [3-5]. Price and trade regarding policy VIZ input-output prices, trading policies, infrastructure and institutional aspects i.e. Size of farm, research and extension programs, marketing channels and related aspects, and government regulations. Considering this background. the present research was conducted to identify factors responsible for shifts in cropping pattern.

## 2. METHODOLOGY

For the present research paper Khed tehsil of Pune district was purposively selected and Khed is adjacent tehsil of Pune city and major part of tehsil comes under Chakan and Moshi industrial area, due to industrialization, urbanization, it is noticed that there is predominant change in area, production and productivity of various crops. Considering the impact of industrialization, 15 villages from western and southern part of Khed tehsil were purposively selected. 10 respondents from each village were considered comprising total 150 respondents by proportional sampling

technique. Data was collected and analysed with help of statistical tools like mean, percentage, standard deviation.

## 3. RESULTS AND DISCUSSION

An attempt was made to analyse the reasons for change in cropping pattern over the period.

Factors are categorised as physical, economical, resource, technological and climatic factors for the zone as a whole and the results are presented in Table 1.

It was observed from Table 1 that, among physical factors almost 92.67 per cent and of the respondents changed the crops quoting the reason as 'variation in temperature and humidity' and 'change in rainfall pattern' 'availability of irrigation' (78.00 per cent), 'affected soil' (66.67 per cent). Further, majority of the respondents changed the crops due to resource related factors such as 'more irrigation requirement' (96.67 per cent) , 'demands more plant protection measures' (93.33 per cent), 'requires more labour for various operations' (88.67 per cent) ,49.33 per cent , 42.00 per cent and 29.00 per cent of the respondents changed the crops due to other resource related factors such as 'Use of dual crop', 'reduced per capita land holding' and 'requires more fertile land', respectively.

Amongst technological factors, 86.67 per cent of the respondents changed crops due to 'use of advanced farm machinery', 'Availability of power/ electricity on farm' 74.67 per cent as the reasons.73.33 per cent of the respondents changed the crop due to technological reason like 'cost and time consuming crop'. Among biological factors almost (88.67 per cent) of the respondents changed the crops due to 'reduced yield due to pest and disease attack' followed by 'more pest and diseases incidence' (86.67 per cent). Biological factors are both dominantly affect change in cropping pattern. It was also observed that from the economic and social factors, majority of respondents changed crop due to market price (90.00 per cent), followed by availability of market (85.33 per cent), and requirement of labour (64.00 per cent).

**Table 1. Frequency of response of respondents to factors causing shifts in cropping pattern over the years. (n=150)**

Factors	Particulars	Frequency	Percentage	Rank
Physical Factors	Variation in temperature and humidity	139	92.67	I
	Change in rainfall pattern	136	90.67	II
	Availability of irrigation	117	78.00	III
	Affected soil	100	66.67	IV
	Waterlogging of soil	56	37.33	V
Resource factors	More irrigation requirement	145	96.67	I
	More demand of plant protection measures.	140	93.33	II
	Requires more labour for various operations	133	88.67	III
	Use of dual crop	74	49.33	IV
	Reduced per capita land holding	63	42.00	V
	Requires more fertile land	41	27.33	VI
Technical factors	Use of advanced farm machinery	130	86.67	I
	Availability of power/ electricity on farm	112	74.67	II
	Cost and time consuming	110	73.33	III
	Availability of new crop varieties.	99	66.00	IV
	Use of fertilizers	78	52.00	V
	Use of mono cropping, double cropping	67	44.67	VI
Infrastructure factors	Processing	136	90.67	I
	Transport	102	68.00	II
	Post-harvest handling	101	67.33	III
	Storage	76	50.67	IV
	Irrigation	74	49.33	V
	Trade and marketing	37	24.67	VI
Biological factors	Reduced yield due to pest and disease attack	133	88.67	I
	More pest and disease incidence	130	86.67	II
Social Factors	Market price	135	90.00	I
	Availability of market	128	85.33	II
	Requirement of labour	96	64.00	III
	Food habit of people	79	52.67	IV
	Credit availability	47	31.33	V
Historical Factors	Land Fragmentation	101	67.33	I
	Share cropping system for production of crops	79	52.67	II
	Money lending/ taking family	75	50.00	III
Govt. Policy	the legislative and administrative policy of government	107	71.33	I
	Price maximization through MSP and FRP	78	52.00	II
	Subsidies given by government	63	42.00	III

**Table 2. Average values of factors and their ranks responsible for change in cropping pattern**

Sr. No.	Factor	Value	Rank
1	Biological factors	87.67	I
2	Physical Factors	73.07	II
3	Technical factors	66.22	III
4	Resource factors	66.22	IV
5	Social Factors	64.67	V
6	Infrastructure factors	58.45	VI
7	Historical Factors	56.67	VII
8	Government Policy	55.11	VIII

With regards to historical factors, 67.33 per cent of respondents changed crop due to 'land fragmentation followed by share cropping system of crop production (52.67 per cent). In present time, government policies influence farmers through MSP, FRP, and other subsidies for crops. More than seventy (71.33 per cent) of farmers influence to change cropping pattern due to legislative and administrative policies, followed by price maximization of MSP and FRP (52.00 per cent) and subsidies provided by government (42.00 per cent) respectively.

The data from Table 2 shows the average value of factors and their ranks responsible for change in cropping pattern. Among the all factors under study biological factors (87.67 per cent) ranked first for shifts in cropping pattern, while physical factors (73.07 per cent) ranked second for shifts in cropping pattern, technical and resource factors (66.22 per cent) equally responsible for shifts in cropping pattern over the years, Social factors (64.67 per cent), infrastructure factors (58.45 per cent), historical factors (56.67 per cent), and government policy (55.11 per cent) ranked fifth, sixth, seventh, eighth respectively. The factors are not solely responsible for change in cropping pattern; they are dependent on each other.

Similar finding found in research papers Shetty (2014) 51.00 % farmers changed crops due to biological factors i.e. insect and pest disease incidence, Chavare [6] 35.00 % farmers changed cropping pattern due to physical factors i.e. Availability of land ,land fragmentation, 44.00 % changed due to climatic factors ,Shakeel [7] 46.33% changed due to technical factors i.e. availability of high yielding varieties of crops, Khan and Ahmed [8] 66.66 % change in cropping pattern due to social factors i.e. market price [9-11].

#### 4. CONCLUSION

With introduction of modern agricultural technologies, continuous change in cropping patterns seen primarily due to industrialization, urbanization nearby city area. It is observed from study that not only one factor responsible for this change but it is a result of all interrelated and inter-dependent factors viz. biological, physical, technological, social factors. resource related factors etc. It is revealed that amongst all factors biological factors ranked first due to huge incidence of pest and disease attack, followed by physical factors, technical and resource factors,

social factors subsequently. This also directly hampers production and yield of crops.

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Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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