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Crop Diversification in Haryana

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Abstract: Agriculture is an imperative for the development of an economy because most of the rural population directly or indirectly reliant on agriculture for their livelihood. After the green revolution in 1966-67, there was crop specialization enlarged in India towards rice and wheat in particular. In the 1990s there has been seen crop diversification had been taking place in Indian agriculture to mitigate the risk associated with mono-cropping. Diversification towards high value crops such as horticulture has been taking place. The study tries to analyze the trend, pattern, and magnitude of crop diversification in Haryana. In the study, the researcher includes variables such as, the landholding size, cropping pattern, and diversification towards the high remunerative crops. The study is based on the secondary data collected from various government sources. The study found that farmers of Haryana diversified their cropping pattern towards fruits and vegetables. Keywords: Agriculture, Landholding, Diversification, Remunerative

Introduction

"The word diversification has been consequent from the term 'diverse' which means to move or extend in a direction, different from a common point", said Jha. Agriculture diversification can be defined as the alteration from agricultural to nonagricultural activities such as dairy, poultry, animal husbandry, etc. Most of the population in India is dependent on the agriculture sector but the share of this sector in the gross domestic product is falling. Employment pressure on this sector is still high as compared to the other sectors. JUCR

Year	% Share in GVA
2011-12	18.5
2012-13	18.2
2013-14	18.6
2014-15	18.2
2015-16	17.7
2016-17	17.9
2017-18	17.1
2018-19	17.6
2019-20	18.4
2020-21	20.2

Tabl	e 1.1:	: Per	cent s	share	of (<mark>Gro</mark> ss	Value	Added	(GVA)	at	Cu	rrent	Prices

Source: NSO, Ministry of Statistics and Programme Implementation

Table 1.1 and figure 1.1 clearly shows that, almost stagnant growth in agriculture sector from 2011 to 2019 and it is lies from 17 percent to 18 percent. In 2020-21 there is significant increase in the GVA of the agriculture sector.



Table 1.2: Pattern of Landholding in India

Category of holding	Operated Area
Smallholding	1.00 to 2.00 hectares
Medium holding	4.00 to 10.00 hectares
Large holding	10.00 and above hectares

Source: Agriculture Census of India

Table 1.2 explained that, in the state there are three types of holding namely smallholding, medium holding, and large holding. The operated area under these holdings are 1 to 2 hectares under small holding and 4 to 10 hectares and above 10 hectares under medium and large holding respectively.

Table 1.3: Land Utilization in Haryana 2018-19

Component		Percent share in to	ta <mark>l area</mark>	
Net area sown		82.4		1
Land not available for cultivation		10.2		62
Forests		0.8		
Other uncultivated land excluding fal	llow land	3.4		

Source: Statistical Abstract of Haryana

Land utilization in Haryana shows in table 1.3. It shows that land under the net down area is highest which is 82.4 percent and 10.2 percent land under the land which is not available or cultivation. Only 0.8 percent of land utilize for forests.



Importance of Crop Diversification

Crop diversification refers to the changes in cropping patterns or introduces new crops to agricultural production. Currently, 70 to 80 percent of farmers had land below 2 hectares. These farmers must be diversified with high remunerative crops such as maize, pulses, etc. The Government of Haryana has also promoted diversification by giving Rs. 7000 per acre incentive for switching to an alternate crop under the scheme "mera pani-meri virasat". Crop diversification promotes economic stability by reducing the risk associated with the price of various farm products. It also reduces the occurrence of natural calamities like erratic rainfall, drought, and pest disease. In this case, a crop mixed cropping pattern would be useful. It is also helpful in conservation of the natural resources by changing more water-dependent crops to less water-consuming crops such as legume rice, and wheat.

Objectives of the study

- 1. To analyze the trend in the production of various crops in Haryana with special reference to horticulture crops.
- 2. To check the magnitude of crop diversification in Haryana.

Review of Literature

Anuja et al. (2021) explored the pattern of crop diversification in India by using District level data from various years. It was based on the land use statistics of different years. The study used the Simpson index of diversification to track the magnitude of crop diversification. The study implied that there are large regional disparities between the diversification of food crops and nutritional outcomes. The study also found that there is a negative relationship between diversification and undernutrition in various districts under the study.

Francaviglia (2021) noted that agriculture diversification contributed to increasing food production as well as food security. The study used primary data collected in Italy. The study recommended that management practices are important for encouraging the intensive agriculture system.

Barman et al. (2022) examined crop diversification as a way to achieve sustainable agriculture goals It improves the biological cycles to minimize the input cost, maximize returns and decrease risk due to environmental and ecological elements. The study revealed that the intensification of crops increased the net returns and productivity of a farm. Crop diversification improves nutritional security, ensures food security, generation of employment, and moves toward sustainable agriculture.

Vernooy (2022) identified crop diversification as a tool to mitigate climate change impacts on agriculture. It promotes the resilience of the household or community. The findings of the study revealed that there are positive outcomes because it increases yields, income, nutrition, and food security. The study noted that apart from all these impacts, crop diversification also improves the environment quality and moves toward a more sustainable future.

Rawat and Bala (2021) determined the pattern of crop diversification in Haryana. The study found that rice and wheat were the major staple food crops of the state. The study also revealed that the area under rice was highest in the Karnal and Kaithal districts. Based onyield Gurugram is at the top. But the state has faced many difficulties due to excessive cultivation of rice such as water shortageand declining soil quality.

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Ansari (2018) examined the growth of horticulture crops in India over the years. The study found that in the 1980s there has no diversification but during the early 1990s itmoves towards horticulture crops accompanied by the introduction of LPG policies in India. And now the economy started diversifyingtowards nonfood crops such as fruits and vegetables. Factors responsible for crop diversification identified by the study were the rate of return and productivity of the crops which was higher in the case of horticulture.

Mallick and Pattabayak (2017) explored the relationship between crop diversification and sustainable agriculture. Herfindahl index was to be used in the study and secondary data was collected from 2007-08 to 2013-14 of various crops. And the study found that area under coarse cereals has been declined from 2.10 to 1.76 percent. And the area under fruits and vegetables has been increased continuously. According to the study,the highest crop diversification in Andhra Pradesh followed by West Bengal, Bihar, Maharashtra, and Karnataka.

Lava and Kuri (2016) presented empirical indication from West Bengal to identify the relationship between crop diversification and food security. The study found that regions having a low level of crop diversification had an acute deficit of per capita availability of food production. It showed that regions with high per capita production observed high level of crop diversification.

Methodology

In the study, secondary data is used for analysis, and data was collected from various Government sources such as the Ministry of Agriculture, statistical Abstract, horticulture department of Haryana, agriculture census of India, etc. The data was analyzed by using various analytical tools and a diversification index.Simpson index is used in the study to find out the magnitude of crop diversification.Simpson index (D) is derived from the Herfindahl index. Simpson index is equal to one minus the Herfindahl index. Here D is the Simpson index, and p is the proportion share in the gross cropped area of each crop.

$$D = 1 - \sum_{i=1}^{N} (p_i)^2$$

The value of the index lies between zero and one. One means there is perfect diversification and zero means no diversification or crop specialisation.

District	Area in 2018-19
Ambala	3950
Bhiwani	36
Charkhi Dadri	0
Faridabad	1
Fatehabad	663
Gurugram	7
Hisar	7496
Jhajjar	0
Jind	304
Kaithal	17
Karnal	976
Kurukshetra	13,862
Mahendragarh	3
Nuh	1216
Palwal	0
Panchkula	1315
Panipat	234
Rewari	115
Rohtak	26
Sirsa	594
Sonipat	108
Yamunanagar	1569

Table 1.4:District-wise area under fruits and vegetables in Haryana

Source: Horticulture Department of Haryana



Table 1.4 depicts that, the area under fruits and vegetables is highest in the Kurukshetra district followed by Hisar, Ambala, and Yamunanagar. This shows that these districts of Haryana have diversification in favour of horticulture crops.

	Production	in million tones
Year	Production of food grains	Horticulture production
2004-05	198.36	166.94
2005-06	208.60	182.82
2006-07	217.28	191.81
2007-08	230.78	211.24
2008-09	234.47	214.72
2009-10	218.11	223.09
2010-11	244.50	240.53
2011-12	259.29	257.28
2012-13	257.13	268.85
2013-14	265.57	277.35
2014-15	252.02	280.99
2016-17	275.68	299.85

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Source: Department of Agriculture, Cooperation & Farmer's Welfare

Table 1.5 described the picture of production of food grains and horticulture crops in India. Trend line shows the increasing tendency of horticulture production means that continuous increase in the diversified production in the state.



Table no. 1.6: Share of Crops in Gross Cropped Area in various years

		Jowa	Bajr	Maiz	W	hea	Barle	Gra	Pulse Groundn		Mustar	Cotto	Sugarca	Oilsee	Horticultu		
Years	Rice	r	a	e	t		у	m	s	s uts		ds	n	ne	ds	re	Total
1966-								106									5352.2
67	192	270	893	87		743	182	2	1150		11.1	198	183	150	212	19.17	7
1970-		207.	879.	114.	1	129.	~	106	1158.		<u> </u>						5597.2
71	269.2	3	6	4		3	108.6	3	9		10.4	129.8	193.4	155.7	142.6	35.07	7
1980-		136.	870.					721.									10949.
81	483.9	9	3	71.3	1	479	124.5	9	794.8		6.2	299.6	316.2	113.1	311.2	63.22	5
1990-		129.	608.		18	850.		649.					1.1				6510.3
91	661.2	4	6	34.8		1	50.5	3	742		2.6	473.8	490.6	147.8	488.5	181.11	1
2000-	1054.	109.	608.		23	354.		124.							/		
01	3	4	3	15.4		8	44.1	5	157		0.3	408.8	555.4	143	414	277.5	6266.8
2005-	1046.		631.		23	302.		129.						/			12777.
06	6	89.2	7	17.5		7	- 28.2	8	195.3		3.8	707.8	583.8	129.2	735.8	415.93	1
2010-	1243.	2	659.					111.					/		5		
11	3	70.8	6	9.6	2	504	37.3	5	175.3		2.3	509.7	493.3	84.5	521	490.7	6912.9
2015-	1353.		369.		25	575.					1				1		
16	1	55.1	9	6.1		6	28.9	43	63.3		4.5	510.4	615.2	93.5	526.8	528.6	6774
2017-			449.		25	530.					~			0			6985.9
18	1422	47.5	3	6.4		5	20.2	32	56.6		3.3	548.9	668.5	114.9	559.6	526.22	2
2018-	1446.		424.		25	553.											20672.
19	9	40	7	6.2		2	15.5	44	85.4		3.5	609.8	708.9	108.7	626.6	465.12	8

Table 1.6 shows the share of various crops in the total gross cropped area.

Diversification Index (Simpson index)
0.857194258
0.847985654
0.961009969
0.858872457
0.800742461
0.948339558
0.804908824
0.78608654
0.795386399
0.975901154

Source: Authors own calculation by using secondary data.

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Diversification index trend line shows that, there is significant crop diversification exhibits by the state. The value of index clearly described that, diversification in the state increasing step by step like jerks.

Conclusion

Agriculture progress and diversification of crops is the main issue of the concern in agriculture in India. Haryana is one of the prominent State in terms of agricultural produce so it plays a vital role in India's agricultural sector. Many changes have been taking place in Haryana's agriculture sector because of economic reforms. The study analyses the growth of crop diversification in the State and the found that there is increasing progress of crop diversification specifically towards horticulture crops. Among the various districts of the State Kurukshetra and Hisar recorded highest growth in terms of area allotted to horticulture crops and Charkhi Dadri, Jhajjar and Palwal have zero or no diversification. Value of Simpson index shows that in the State crop diversification has been taking place and increasing during the years of 2017 to 2019. The Government of Haryana should have to take more steps toward promoting the more diversification to save natural resources of for the sustainable agriculture.

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