Cover Page
DOI: http://ijmer.in.doi./2021/10.06.103

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:6(6), June:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th June - Publication Date:30th June 2021

URBANISATION AND ITS IMPLICATIONS ON CHANGING CROPPING PATTERN AND CROP DIVERSIFICATION OF BATHINDA DISTRICT (PUNJAB)

Ms. Ruchi Arora
Panjab University,
Chandigarh, Punjab, India

Abstract

Agriculture is a basic primary and needful activity in which major population is indulged.This research paper is an attempt to understand and analyse the agricultural land use pattern of Bathinda district, situated in the Malwa region (physiographic division) of the state of Punjab. Bathinda is a semi-arid region with moderate rainfall and temperature characteristics. This study examines crop diversification in Bathinda which is an important characteristic of cropping land use system. Crop diversification is a conceptopposite to cropping intensity.

The research reveals that cropping pattern and land use land cover of the district has witnessed noticeable changes with the urban profile of the region. It highlights the impact of urbanisation upon crop diversification with temporal variations.Gibb's & Martin'smethod of crop diversification has been used to generate comparative analysis between the 7 blocks of Bathinda district in the year 2019-20.

Keywords: Crop Diversification, Cropping Intensity, Cropping Pattern.

Introduction

Crop Diversification is growing of variety of crops to lessen the risk factor and expand the production related activities i.e. generating employment. It is a new instance of sustainable agriculture. Hayami and Otsuka (1992) said that crop diversification is the shift of resources from low value agriculture to high value agriculture. On a specific farm new crops or cropping system is added to cultivate for getting different outcomes with complementary market facilities.

It mainly depends upon the socio-economic indicators of the farmers, the technological development of a country/region, institutional and infrastructure covering the farm size and tenancy issue and the price related factors covering output and input prices, trade and other economic policies that affect these prices.

Crop diversification helps in the increase of income of small-scale farmers, it minimizes price fluctuations in the market, helps in balancing the food demand, improves the fodder generation, conserves the natural resources like soil, water etc, also minimizes the environmental pollution.

Study Region

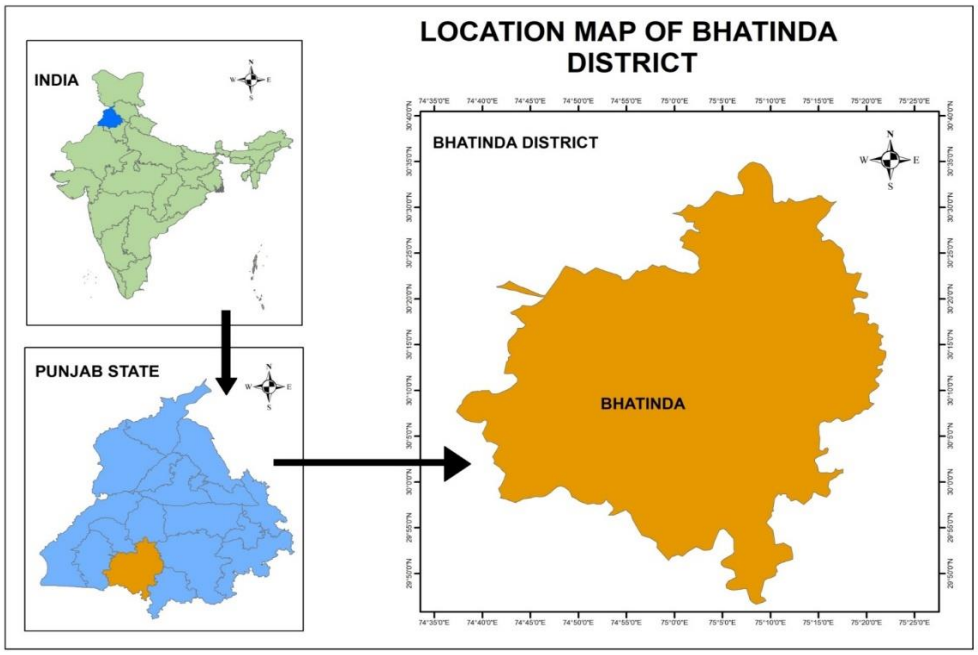
This study features the crop diversification of Bathinda district situated in the State of Punjab. It lies in the south-western region of the state and is far away from the Shivalik hill ranges in the north-east. It is nearer to the Thar desert of Rajasthan and quite away from the major rivers that run through the state. It is in Malwa region of Punjab, India. The main aim for choosing Bathinda district as the part of this study was its uniqueness in all the climatic aspects from the other regions of Punjab, as it is a semi-arid climatic region with very hot summers, short rainy season and a bracing cold winter in Punjab which is considered to be a fertile area with 5 rivers flowing in it. The district is situated in Sutlej-ganga plain and the entire area is a low-lying area. The location of Bathinda is between 29°33' to 30°36' north latitude and 74°38' to 75°46' east. The district encompasses an area of 3335 square kilometres. Bathinda has many water bodies in it. There are rivers and canals passing through it. The main source of irrigation in Bathinda district is canals. Many tributaries of sirhing canal pass through the district. The higher regions of the district use wells.

Major soil present is sierozem (an arid soil) with a texture of sandy loam to silt.

The district is divided into four tehsils, namely Bathinda, RampuraPhull, Talwandi Sabo and Maur which are sub-divided into seven blocks namely Bathinda, Nathana, Sangat, Talwandi Sabo, Maur, Rampura and Phull.

Cover Page
DOI: http://ijmer.in.doi./2021/10.06.103

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:6(6), June:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th June - Publication Date:30th June 2021



Map 1 – Study Region "Bathinda"

Objectives

1. To discuss the change in land use pattern of Bathinda district from 2009-10 to 2019-20 under the influence of **URBANISATION**.
2. To see the major crops grown (cropping pattern) in the Bathinda District in the year 2019-20.
3. To analyse the comparative study between the 7 blocks of Bathinda District in relation to the level of crop diversification in the year 2019-20.

Data Collection and Methods Used

The data for the present study has been collected majorly from the Department of Agriculture (Krishi Vibhag), Bathinda.

Methods Used

- Observational Analysis
- Statistical Analysis – Crop Diversification **(GIBB'S & MARTIN'S METHOD)**

Index of Crop Diversification =

$$1 - \frac{\Sigma X^2}{(\Sigma X)^2}$$

Here,
X = the percentage of total cropped area occupied by any individual crop.

C.D. varies between 0.1- 0.9

Results & Discussion

Land Use Land Cover

Land use can be defined as the purpose the land is serving like agriculture, recreation, wildlife habitat and land cover is the surface area/cover occupied by vegetation, urban infrastructure, etc. When used together as LU/LC (Land Use Land Cover) it classifies the natural elements and human activities on the land surface with a time frame based on some analyzing methods and some appropriate source materials.

Agriculture land use studies the land under different uses like net sown area, forest, cultivable land, etc.

Cover Page
DOI: http://ijmer.in.doi./2021/10.06.103

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:6(6), June:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th June - Publication Date:30th June 2021

Table 1: Land Use Land Cover of Bathinda District in 2009-10 and 2019-20 (Area in Hectares)

Sr. No	Component	2009-10	2019-20
1	**Geographical area**	**336725**	**336725**
2	Forest	6047	5862
3	Non-agriculture use	51389	42450
4	Total cultivable area	279289	289113
5	Fallow land	-	700
6	**Net Area Sown**	**279289**	**288413**
7	Area Sown more than once	276217	265296
8	**Total cropped Area**	**556206**	**553709**
9	Cropping Intensity (%)	199%	192%
10	Area irrigated by Canal	235319	245705
11	Area irrigated by Tube well	43578	38673
12	Total Area irrigated	278897	284378
13	Electric Tube well	-	35202
14	Diesel Tube well	-	26870
15	Total Tube well	-	62072
16	Total No. of Farming Families (as per Census 10-11)	-	57270

Source: Agriculture Department, Bathinda

This table shows that the total geographical area of Bathinda district is 336725sq. kms. The total cropped area in 2009-10 was 556206 sq kms where it decreased in 2019-20 to 553709 sq kms but the observation shows that though the total cropped area has decreased but net area sown has increased from 279289 sq kms in 2009-10 to 288413 sq kms in 2019-20.

Cropping Pattern

Cropping Pattern can be referred as in which way crops are grown, each crop occupying what area in an agriculture year. It is a dynamic concept which keeps on changing with time as no cropping pattern is good for all times it has to be suitable for a particular period according to the physical and socio-economic scenario.

Table 2: Cropping Pattern in Kharif Season 2019-20

Blockwise/Cropwise Area during Kharif 2019-20 (Area in Hectares)									
S. No.	Crops	Bathinda	Nathana	Sangat	Talwandi Sabo	Maur	Rampura	Phull	Total of the District
1	**Cotton-A**	**13283**	**2688**	**20254**	**27945**	**8371**	**3945**	**1035**	**77527**
2	Cotton-D	71	59	43	62	17	88	121	**461**
3	**Moth**	**38591**	**25816**	**14640**	**16681**	**18727**	**23473**	**41163**	**179091**
4	Bajra	16	21	16	2	13	0	35	**103**
5	Guarara	796	180	1691	1321	194	109	71	**4362**
6	Sugarcane	4	3	4	5	3	17	21	**57**
7	Moong	70	47	71	54	0	0	64	**306**
8	Aarhr	21	15	7	0	0	0	14	**57**
9	Peanut	0	0	18	0	0	0	11	**29**
10	Vegetables	445	119	143	131	124	27	1343	**2332**
11	Flowers	315	59	296	265	554	18	28	**1535**
12	Fodder	3059	1305	1554	2239	1254	1038	3184	**13633**
13	Sapheda	12	0	7	5	0	0	0	**24**
14	Jakhira	77	32	16	13	53	11	0	**202**
15	Akwaar	9	0	0	0	0	0	0	**9**
Total		**56775**	**30344**	**38760**	**48723**	**29310**	**28726**	**47090**	**279728**

Source: Agriculture Department, Bathinda

Table shows the cropping pattern in Kharif Season in 2019-20 which states the major crops grown during this season in Bathinda were Moth and Cotton-A

Cover Page
DOI: http://ijmer.in.doi./2021/10.06.103

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:6(6), June:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th June - Publication Date:30th June 2021

Table 3: Cropping Pattern in Rabi Season 2019-20

Blockwise/Cropwise Area during Rabi 2019-20 (Area in Hectares)									
S. No.	Crops	Bathinda	Nathana	Sangat	Talwandi Sabo	Maur	Rampura	Phull	Total of the District
1	Wheat	51455	28049	36448	45371	26861	26049	41514	255742
2	Barley	119	35	123	188	47	63	78	**653**
3	Sarson	335	161	598	721	154	116	201	**2286**
4	Gram	34	16	18	7	11	9	54	**149**
5	Vegetables	246	96	116	162	83	106	152	**961**
6	Potato	449	386	29	14	16	1283	1740	**3917**
7	Orchid	357	48	253	241	467	26	43	**1435**
8	Javi	2770	975	1383	1583	901	982	1019	**9613**
9	Barseem	565	762	232	236	145	443	1370	**3753**
10	Sapheda	6	0	6	32	0	0	8	**52**
11	Trees	48	7	6	8	11	5	10	**95**
12	Ocvar	12	0	0	0	0	0	0	**12**
13	Tarameera	1	0	0	0	0	0	0	**1**
14	Garlic	1	0	0	0	0	0	0	**1**
15	Nursary	0	0	0	0	2	0	1	**3**
Total		**56398**	**30535**	**39212**	**48563**	**28698**	**29082**	**46190**	**278678**

Source: Agriculture Department, Bathinda

Table shows the major crops grown in Bathinda in Rabi Season during 2019-20 was wheat.

Crop Diversification

Crop diversification is adding up of crops on a particular farm for decreasing the risk of any crop failure and increases the employment throughout the year. It means a completion for space between the crops in a defined region. It is shift from one crop dominance to number of crops to meet the demands. It is opposite of Crop intensity. It is dependent upon socio-economic conditions and technological development but stronger are the physical conditions of the area.

Gibb's and Martin's Technique is used to calculate the index of crop diversification which is as under-

$$1 - \frac{\Sigma X^2}{(\Sigma X)^2}$$

Here,
X= the percentage of total cropped area occupied by each crop.
According to this method crop diversification varies between 0.1-0.9
Higher the index higher the diversification and lower the value lower the diversification.

Table 4: Range of Category of the Index Value of Crop Diversification of Gibb's & Martin's Method

S.No.	Range of Category	Category
1	Above 0.65	High
2	0.55-0.65	Medium
3	0.45-0.55	Low
4	Below 0.45	Very Low

Table 5: Index of Crop Divrsification in 7 blocks of Bathinda district

S.No.	Block	Index of Crop Diversification
1	Bathinda	0.49
2	Nathana	0.61
3	Sangat	0.68
4	Talwandi Sabo	0.67
5	Maur	0.66
6	Rampura	0.63
7	Phull	0.60

Source: Compiled by author

Cover Page
DOI: http://ijmer.in.doi./2021/10.06.103

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:6(6), June:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th June - Publication Date:30th June 2021

The table shows block wise index of diversification of Bathinda district, Punjab. Sangat, Talwandi Sabo and Maur shows the diversification towards higher side. Nathana, Rampura and Phull are under moderate diversification. The Bathinda block has the least index and is in the low category of index values.

Figure 1: Index of Crop Diversification in 7 blocks of Bathinda District

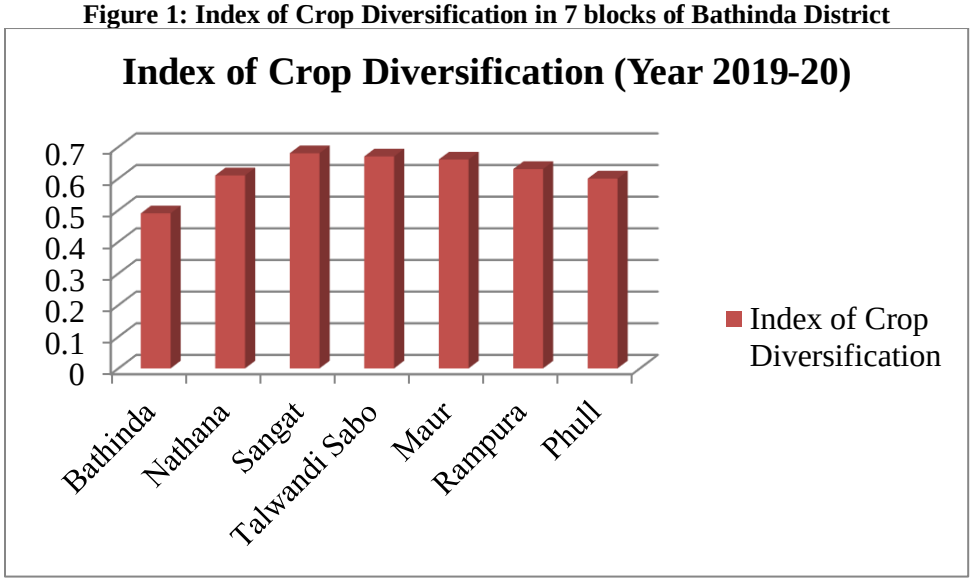


Figure shows the level of Crop diversification in different blocks of Bathinda district.

Conclusion

1. From this study we conclude that the total cropped area which was 556206 in 2009-10 has decreased to 553709 which is a negative effect of urbanisation but it is also seen that net area sown has increased from 279289 to 288413 leaving a positive impact on agriculture.
2. The cropping pattern of the district shows that the major crops grown in 2019-20 are Cotton-A, Moth and Wheat.
3. The Index of Crop Diversification calculated using Gibb's & Martin's method among the 7 blocks of Bathinda district shows that Sangat, Talwandi Sabo and Maur have high diversification, Nathana, Rampura and Phull have moderate diversification and Bathinda block has diversification at lower side.

References

Hussain M. (1996) – Systematic Agriculture Geography
Jasbir Singh and S S Dhillon (2004) – Agriculture Geography
K. S. Ahmad, (1939) – The Agricultural Geography of the Punjab
Manku Darshan Singh (2009) - Geography of Punjab
Majid Husain (1994) – Agricultural Geography
http://en.m.wikipedia.org/wiki/Agriculture_in_India
http://www.google.co.in/amp/s/www.researchgate.net
http://en.m.wikipedia.org/wiki/Bathinda
http://m.bathindaonline.in/city-guide/geography-of-bathinda
https://www.indiastatdistricts.com/punjab/bathinda-district
https://www.environmentalpollution.in/land/land-use-pattern-in-india-with-statistics/1217