

# An Analysis of Crop Diversification in Rupnagar District of Punjab

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**Abstract:**After green revolution era there is continuous changes in crop pattern of Punjab which focused only on wheat-paddy circle because of technical development in both crops like HYV seeds, fertilizers, pesticides, insecticides etc. No doubt this diminished the food problem of the country and enhances the income of farmers. The shift from traditional crops to these food crops also leads to the problems like depletion of ground water, soil degradation and ecological imbalance (Sidhu et al 2010). Because paddy crop needs huge water but in Punjab the ground water and canal irrigated area is relatively less. The burning of residue of paddy is also challenge for the government because of air pollution and soil degradation (Sharma 2008). Irrigation facilities are the reason for adoption of this crop cycle and decline of area gram, oilseeds, cotton, vegetables and pulses. Wheat and paddy are economically secured because having MSP and other crops have fluctuations every year (Sharma 2008). Cost of production is increases because of diseases and soil degradation but there is stagnation in production and growth rate of agriculture. After 1980s every decade decline in growth rate of agriculture (Kumar and Singh 2010). The monoculture of wheat-paddy leads to excessive use natural resources and chemical use which results the depletion of ground water, soil degradation and steady growth of agriculture. The diversification will be the solution for this. Government adopts many schemes for this but there is very steady growth in this diversification.

**Index Terms:** Diversification, Concentration, Punjab, Rupnagar district.

## I. STATEMENT OF THE PROBLEM

Crop diversification is the major challenge for the agriculture of Punjab because this is limited to two major crops wheat and paddy. This crop cycles creates many problems like depletion of ground water, soil degradation, ecological imbalance and stagnation in agriculture growth. There are many reasons for the adoption of this crop cycle like Minimum Support Price, marketing, HYV seeds, mechanization, and government support for food security, lack of awareness and limitation of green revolution. This leads to decrease in area under other crops like oilseeds, pulses, cotton, fruits, vegetables etc. This is serious concern because agriculture is the main occupation of Punjab providing employment and breads to so many peoples in country. After 1990s there is stagnation in growth rate of agriculture sector.

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## A. Study Area

The present study is based on Rupnagar District of Punjab. Punjab is the land of five rivers also known as 'bread basket' of India because of its fertile plains. This is north-western state of India extends from the latitudes 29.30° North to 32.32° North and longitudes 73.55° East to 76.50° East. Pakistan is its western boundary, Jammu and Kashmir is its northern boundary, Himachal Pradesh is its north east boundary and Rajasthan and Haryana are on south. Punjab is a fertile land of five rivers which are SUTLEJ, BEAS, RAVI, JHELMUM and CHENAB tributaries of INDUS River. There are 22 districts in Punjab.

Figure No. 1

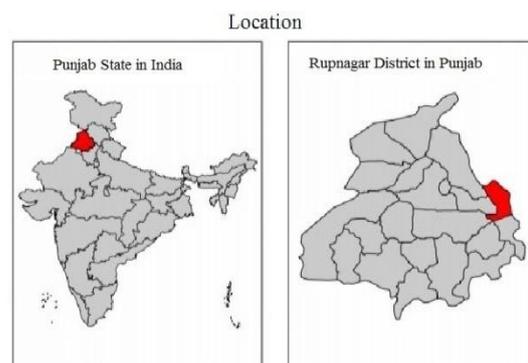
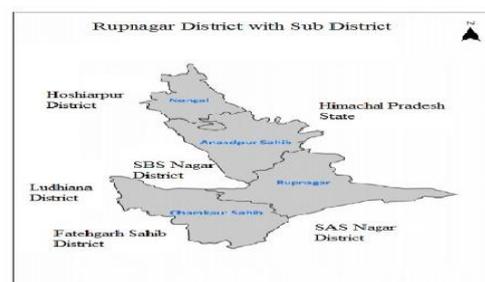


Figure No.2



## B. Objectives

1. To analyse the reason behind the recent trends of major crop cycles.

2. To study the major problems faced by farmers in crop diversification.

## II. RESEARCH METHODOLOGY

The purpose of the study is to find the problems and solutions for crop diversification in Punjab region. This study mainly focuses on good and bad impact of wheat and paddy crop cycle. The method of collecting data will be secondary based. The primary and secondary data will be collected by surveys and various sources of publications like magazines, journals, research articles, internet and published and unpublished records of agricultural census of Punjab as a whole.

## III. A BRIEF DESCRIPTION OF RUPNAGAR DISTRICT

**Rupnagar** district, comes under the Patiala Division of Punjab and the latitude and longitude of Rupnagar are 30°-32'N and 31°-24'N and east 76°-18'E and 76°-55'E. Rupnagar (also known as Ropar city), located on Chandigarh-Jalandhar road 42 Km from Chandigarh, the state capital. The district shares boundary with Nawanshahar, Mohali and Fatehgarh Sahib Districts of Punjab. In Rupnagar District the four Sub- Districts which are Rupnagar, Anandpur Sahib, Nangal and Chamkaur Sahib. Rupnagar[1] district has 624 villages and 6 towns which are Rupnagar, Chamkaur Sahib, Anandpur sahib, Morinda, Kiratpur Sahib and Nangal. Except Chamkaur sahib all towns of Rupnagar District are on railways line. Nangal, Rupnagar and Anandpur Sahib are near to Sutlej River[5].

### Climate, Rainfall and Soil

The climate of Rupnagar District is general dry (except in the south-west monsoon season). The year can be divided into four seasons. The period from middle of November to February is the winter season. The summer season is from March to about the end of June. The monsoon season starts from late June and continues up to the middle of September. The post-monsoon or transition season is ranges from mid-September to the middle of November.

The minimum temperature is 4° C in winter and maximum is 45° C in summer. The hottest months are May and June and coldest months are December and January. Relative humidity in the area is high average is about 70 percent during monsoon. The average annual rainfall in the district is 775.6 mm. And most of the rain is received during the months June to September. The texture of the soil is mainly loam to silty clay loam. Some sandy patches are found along the Sutlej and Choas. Chamkaur Sahib and has sodic soils. The Shiwalik regions of Anandpur Sahib and Rupnagar blocks are undulating.

## IV. PROBLEMS AND PROSPECTS

### A. Problems of Minimum Support Price for diversification

In terms of diversification there are many problems faced by farmers in which first problem is Minimum Support Price for wheat and paddy[2][5]. The cultivation of these

crops is secured because of MSP. The other crops have no MSP that is why there is fluctuations in the price of these crops according to market value. The market price of vegetables and fruits has daily fluctuation according to demand and value, so there is no security of the income from these crops. And this has been confirmed by the local farmers like, Randhir Singh farmer of village BudhaBheora in Rupnagar. As has been found, farmers are avoiding these crops because of risk involved in such crops. That is why they are adopting those crops which have lucrative MSP[4].

### B. Problems of Maize crops in terms of diversification

Maize is the important crop in Rupnagar district after wheat and paddy but area under this crop is not increasing. The reason behind this is that maize is not much important food-grain like wheat and paddy in the country. Further, according to the local farmer like Shamsher Singh from the village Mahalan district Rupnagar, as the yield and market value of this crop is relatively lower than paddy, so they are not cultivating maize crop.

### C. Problems of Sugarcane cultivation

Sugarcane is the crop which can replace the circle of wheat and paddy because this is one year crop plant in November or February month and harvested in same months after one year. This crop is water saving crop. But farmers are facing the problem of payment delay by sugar mills every year. This delay in payment affects the economic circle of the farmers as mentioned by Tarsem Singh farmer of village Baghwali in Rupnagar district. Further, sugarcane also needs more labor because of less mechanization in this crop. Even though government hikes the price of sugarcane but delay in payment of crop is the obstacle for the cane growers. In Rupnagar district there is Morinda Co-operative Sugar Mill in Morinda city. The cost of production of sugar from sugarcane in this sugar mill is high that is why mill is also going in loss. This is because of old technology in the sugar mill. That is why there is always delay in the payment.

#### a. Problem of mechanization and technology in the crops

After green revolution the introducing of HYV seeds of wheat and paddy is the main reason attracts farmers to grow these crops and government's concentration on food security was the reason for this crop pattern. The mechanization of these crops is also high rather than other crops. That is why farmers are ignoring traditional crops like pulses, grams, oilseeds etc.

#### b. Prospects

The prospect of the study is how to bring crop diversification in agriculture. Farmers are facing many problems which are written before. If proper policies about the MSP and technological development in other crops like HYV seeds, marketing will be there than farmers can

change this crop circle[7]. This change will improve the water table of the state and reduce the problem of soil degradation. This will also improve the economic condition of farmers and increase the growth rate of agriculture of Punjab. There are many commercial crops like fruits, Agroforestry etc. can divert the agriculture from wheat and

paddy but government support and awareness should be there.

**TABLE NO. 1**

**AREA, YIELD AND PRODUCTION OF MAJOR CROPS OF RUPNAGAR DISTRICT**

YEAR	PADDY			MAIZE			SUGARCANE			WHEAT			OILSEEDS		
	A	Y	P	A	Y	P	A	Y	P	A	Y	P	A	Y	P
2006-07	32	3631	138	24	2529	61	5	6140	25	58	3782	216	3.5	774	2
2007-08	35	3705	130	25	3278	72	4	6158	25	62	4127	256	2	--	--
2008-09	36	3851	139	23	3348	77	3	5528	10	64	3316	212	2	660	2
2009-10	38	3559	135	21	3050	64	2	6274	13	65	4527	277	2	936	2
2010-11	38	3880	147	23	3316	76	2	5089	10	65	3900	253	2	911	2
2011-12	38	3329	127	21	3534	60	2	6160	12	64	4638	297	2	--	--
2012-13	38	3816	145	23	3221	74	2	6258	19	63	4503	284	2	974	2
2013-14	37	3451	127	23	--	--	2	6273	13	67	4578	307	2	973	2
2014-15	36	3605	129	20	2887	58	3	7921	23.8	66	--	--	2	973	2
2015-16	36	4467	161	20	3727	74	3	7360	22.1	64	4286	274	2	1172	2.3

**V. A BRIEF ANALYSIS OF CROP-DIVERSIFICATION OF RUPNAGAR DISTRICT**

In order to have a brief discussion about the major crops of Rupnagar district with their area, we must have relevant data. The data of these crops has been taken from Agriculture Department Rupnagar. Many crops are sown in Rupnagar district like wheat, paddy, maize, oilseeds (mustard, rapeseed, sunflower), sugarcane, pulses, fodder crops, vegetables and fruits etc[8]. Many traditional crops were also there, but now those have crops have become minor in this region, that is why the data of these crops is not available.

The main crop seasons of the area are Rabi and Kharif[5]. Rabi season is from November to April and the main crops are wheat, barley, oilseeds (mustard, rapeseeds) etc. Kharif season is from June to September and the main crops are paddy, maize and sugarcane.

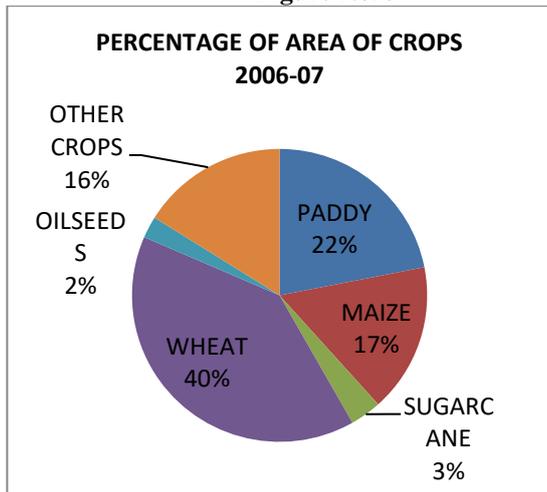
The five major crops of Rupnagar district are wheat, paddy, maize, sugarcane and oilseeds. The net sown area of the district is 79,000 hectare and total crop area of the district is 146,000 hectare. The area, yield and production of five major crops in Rupnagar District from the year 2006 to 2016 have shown in the *Table No. 4.1*.

**A= Area in '000' hectare      Y= Yield average in kg/hectare**

**P= Production in '000' Metric Tones**

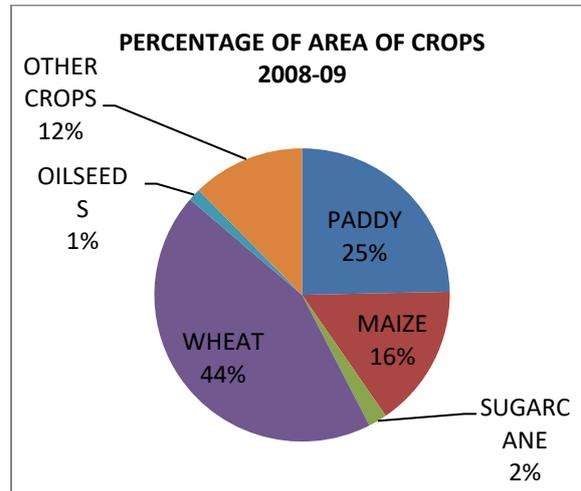
*Table No. 1* shows the area, yield and production of five major crops in Rupnagar district. Crop seasons of Rupnagar are Kharif and Rabi. Paddy, Maize and Sugarcane are the main crops of Kharif season. Wheat and Oilseeds are the main crops of Rabi season. Total Cropped Area of Rupnagar is 146000 Hectare in which most area is under these five crops. In the crop season of 2006-07 the 84% area was under these five crops, and in 2007-08 it was 87.6%, in 2008-09 it was 87.6%, in 2009-10 it was 87.6%, in 2010-11 it was 89%, in 2011-12 it was 87%, in 2012-13 it was 88.3%, in 2013-2014 it was 89.7%, in 2014-15 it was 87% and in 2015-16 it was 85.6%. The above data shows that there are minor changes in the area of these five major crops in these years. Maximum area under these crops was in the season of 2013-14 and minimum area was in the season 2006-07. As per as yield and production of these crops are considered, variability is least. Following are the area wise yearly data, under different Crops in percentage form:

Figure No. 3



Source: Agriculture Department Rupnagar

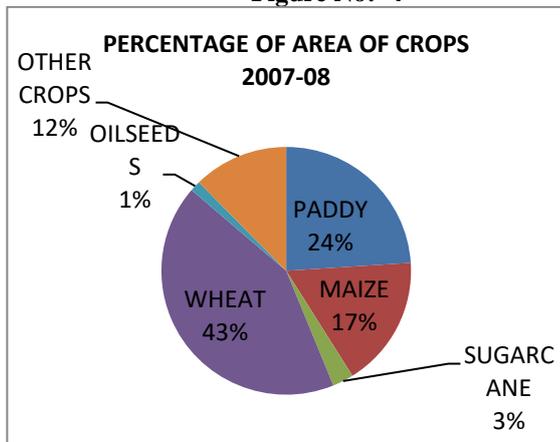
Figure No: 3 shows that in the crop season of 2006-07 maximum area was under wheat and paddy which is 62% (40% under wheat and 22% under paddy). The maize has 17%, other crops (vegetables, fruits, grams, pulses etc.) have 16%, sugarcane has 3% and oilseeds have only 2%. So these all crops have 38% area out of total cropped area. The main concentration was on wheat and paddy.



Source: Agriculture Department Rupnagar

Figure No: 5 shows the crop area of season 2008-09 and in this year again the increase in area under wheat and paddy by 1% from previous season of 2007-08 which is 44% under wheat and 25% under paddy. In this year decrease in the area of maize and sugarcane by 1% which is 2% under sugarcane and 16% under maize. The area under oilseeds and other crops (vegetables, fruits, grams, pulses etc.) remains same like previous year.

Figure No: 4

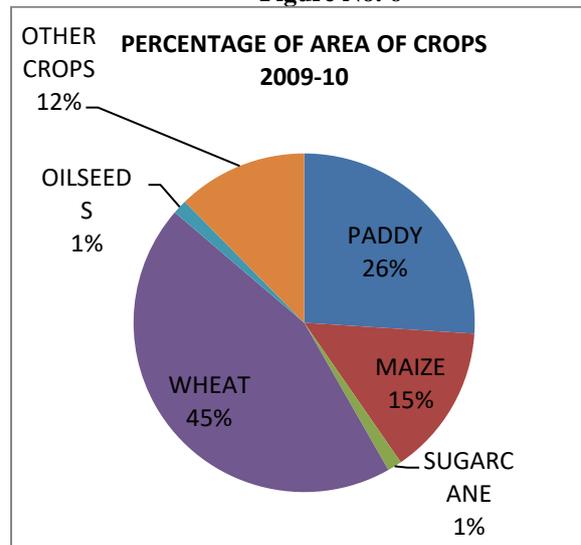


Source: Agriculture Department Rupnagar

In Figure No: 4 the percentage of area under different crops in season 2007-08 shows the changes area under wheat which is 43% increased by 3% from previous year. Area under paddy is 24% increased by 2% by previous year. Area under maize and sugarcane remains same but there is decrease in area under oilseeds and other crops (vegetables, fruits, grams, pulses etc.) by 1% and 4% [6].

Figure No: 5

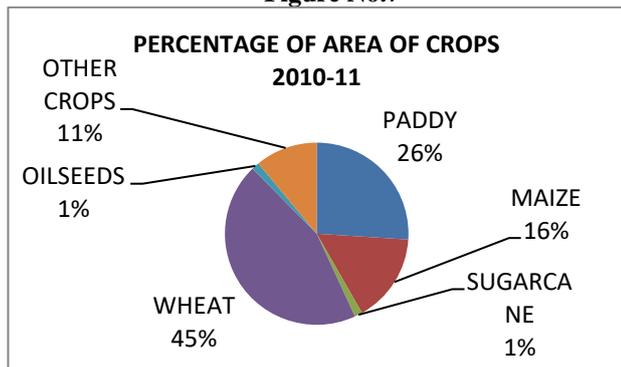
Figure No. 6



Source: Agriculture Department Rupnagar

In Figure No: 6 areas under wheat and paddy is 45% and 26% which increase by 1% in both but there is decrease in maize and sugarcane by 1%. The area under sugarcane is remaining with 1% and area under maize is 15%. The oilseeds and other crops have same area like previous year [6].

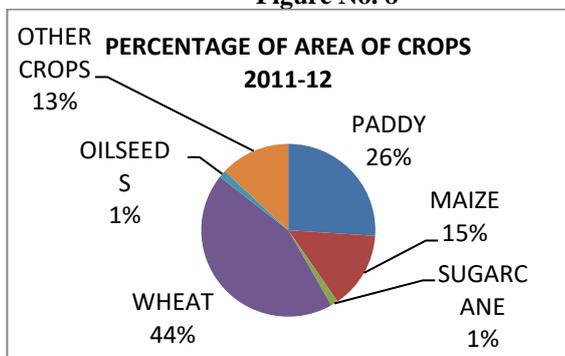
Figure No.7



Source: Agriculture Department Rupnagar

In Figure No:7 areas under crops in season 2010-11 shows that there is change in the area of maize increase by 1% and decrease in other crops (vegetables, fruits, grams, pulses etc.) by 1%. But area under wheat, paddy and sugarcane is same like the season of 2009-10.

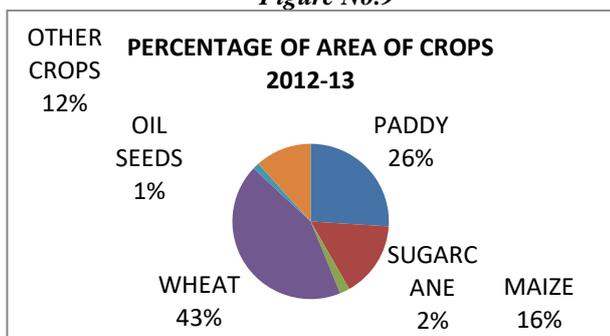
Figure No. 8



Source: Agriculture Department Rupnagar

In Figure No: 8 areas of crops in the season of 2011-12 shows that 70% area under the wheat and paddy but the remaining have only 30%. So in this year main concentration was on wheat and paddy. Most of the area is under wheat crop which is 44%. Sugarcane has only 1% area in this season which is very low[9][11].

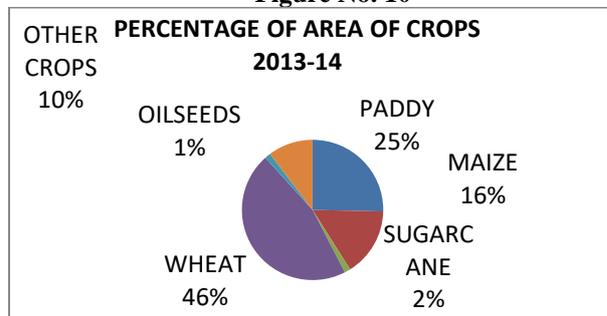
Figure No.9



Source: Agriculture Department Rupnagar

Figure No: 9 shows that the main concentration of cropping pattern of wheat and paddy but there is decrease in the area of wheat by 1%. Here another thing is that there is revival in the area of sugarcane by 2% which was only 1% in previous 2-3 years. Area under other crops was same like previous year little bit changes were there[10].

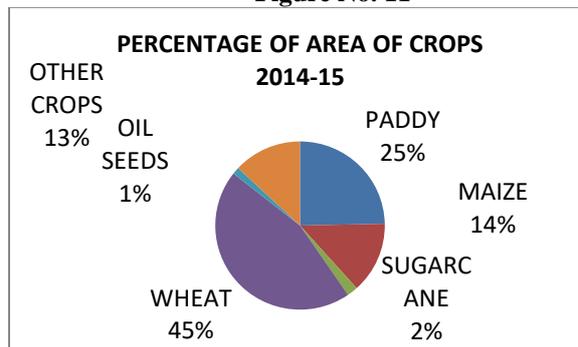
Figure No. 10



Source: Agriculture Department Rupnagar

Figure No: 10 shows that maximum area of crops in the season 2013-14 was under wheat which was 46% and increased by 3% from previous year. There was decrease in the area of paddy by 1% with 25% and also decrease in the area of other crops (vegetables, fruits, grams, pulses etc.) by 2%.

Figure No. 11

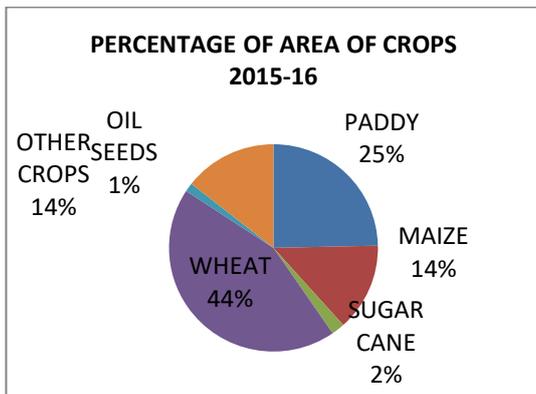


Source: Agriculture Department Rupnagar

Figure No: 11 shows the area of crops in season of 2014-15 the maximum area was again under wheat and paddy by 45% and 25%. There was change in the area of maize decrease by 2% and 3% increase in other crops (vegetables, fruits, grams, pulses etc.)

Figure No. 12





Source: Agriculture Department Rupnagar

Figure No: 12 shows maximum concentration of cropping pattern is towards wheat and paddy with 69% out of total crop area and there are minor changes in the area of wheat and other crops (vegetables, fruits, grams, pulses etc.) with 1% decrease or increase from previous year. The sugarcane, maize and oilseeds have the same area like previous year.

On the above data, we can say that from 2006 to 2016 in Rupnagar district shows that main concentration area wise in crops is on wheat and paddy which is continuously increasing but the area under other crops is decreasing[10]. After both these crops (wheat and paddy), maize is crop which has rank third and have more than 10% area. Remaining crops have only 1 or 2% area like sugarcane and oilseeds. Apart from these crops, vegetables, grams, pulses, fruits etc. are having minor areas which altogether 10-15% only.

TABLE NO. 2:

MINIMUM SUPPORT PRICE (Rs /Qtl.)						
CROP YEAR	PADDY			WHEAT	SUNFLOWER	COTTON
	C	F	S			
2006-07	580+40*	-	610+40*	750+100*	1500	1760
2007-08	645+100*	-	675+100*	1000	1500	1800
2008-09	850+50*	-	880+50*	1080	1650	2500/3000
2009-10	950+50*	-	980+50*	1100	2215	2500/3000
2010-11	1000	-	1030	1170	2350	2500/3000
2011-12	1080	-	1110	1285	2800	2800/3300
2012-13	1250	-	1280	1350	3700	3600/3900
2013-14	1310	-	1345	1400	3700	3700/4000

2014-15	1360	-	1400	1450	3750	3750/4050
2015-16	1410	-	1450	1525	3800	3800/4100
C-Common *Bonus by GOI F-Fine S-Super Fine						

Source: [agripb.gov.in/home.php?page=agmsp](http://agripb.gov.in/home.php?page=agmsp)

Table No.2 shows the minimum support price of four crops which are wheat, paddy, sunflower and cotton in Punjab. In Rupnagar district wheat and paddy are main crops, sunflower has minor area and cotton is not available in the district because of climatic conditions[12].

## V. CONCLUSION

The present study conclude that in terms of crop diversification in the time period of 2006-07 to 2015-16 the major concentration of cropping pattern is towards wheat and paddy. There is continuously increase in the area of these crops. The area under wheat and paddy crops is near about 70% in the most of the years. The area under other crops is shows the decrease from 38% in 2006-07 to 31% in 2015-16. So the maximum area is under only two crops in the Rupnagar district. There are many reasons for this concentration which are: mechanization and technological advancement in these two crops only, the MSP of the wheat and paddy, HYV seeds, food security etc. The other crops are relatively less beneficial than these crops and unsecure. Even though government hike the prices of sugarcane but delay in the payment of sugarcane is the main obstacle in the cultivation of this crop.

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