Agronomic Practices followed by the Farmers in Kharar Division (SAS nagar) Punjab

ABSTRACT

The agriculture industry plays a significant part in the Indian economy, accounting for around 20% of the Gross Domestic product (GDP). Around 62 percent of India's population is reliant on it for survival (Gupta & Nagar,(2017). Agriculture is a crucial sector of the Indian economy as it contributes about 20.19 percent of GDP (DAC&FW Annual Report, 2020-21). Agronomical practices include all the practices which are followed by the farmer from seed to seed i.e. from seed sowing to seed harvesting and storing. The study was conducted in Kharar block, district SAS Nagar (Punjab). Three villages were selected randomly. A questionnaire was prepared to interview the farmers. After the collection of the data from respondents data were classified and analyzed with the help of suitable statistical measures. As per the data collected overall 100%, of farmers grow wheat and about 98% of respondents grow paddy crop in their fields. Apart from these two crops around 52% of farmers grow cauliflower crop in their fields overall 46% of farmers cultivate the mustard crop. The overall amount of fertilizers used by the respondents are more than the recommended dose. *Phalaris minor* is the major weed, apart from this about 92% of farmers face the problem of Grasshopper insects in the paddy crop. The average yield of wheat, paddy, and cauliflower is 52, and 75,243 QTLs/ acre respectively.

Keywords: Agronomic practices, farmer, yield, average, production, crops

INTRODUCTION:

Agriculture plays a vital role in socio-economic development. In India, agriculture is the primary source of livelihood for about 58 percent of the population (IBEF, 2021) and approximately 70 percent of rural households depend on agriculture only. The agriculture industry plays a significant part in the Indian economy, accounting for around 20% of the Gross Domestic product (GDP). Early in history, agriculture was done for domestic purposes only, as time passes new technologies in agronomic practices and developments were made to enhance crop production and people started earning from agriculture too. But several adversities emerged in the socio- economic areas along with the environmental hazards (Bhatt et al., 2019).

Agricultural technology is a vital part of food system sustainability. The Green Revolution exemplifies how scale-independent technology reshaped agricultural productivity. The Green Revolution has resulted in higher yields, poverty reduction, infrastructure development, increased food availability, and lower food prices, among other benefits (McCullough et al., 2012). Agronomical practices include all the practices which are followed by the farmer from seed to seed i.e. from seed sowing to seed harvesting and storing. Agronomical practices are directly proportional to the yield of the crop. In order to obtain good yield farmers must follow best agronomical practices according to the season and agro-climatic zone. These practices vary from region to region. There are 6 agro-climatic zones in Punjab. SAS Nagar comes under the Undulating plain zone, where temperatures are cold, humid to sub-humid, and semi-arid to humid. Rainfall varies between 165mm to 1000 mm. The soil of this area is suitable to grow vegetables, wheat, maize, paddy, sugarcane, sorghum, etc. (Anuj Agnihotri Chaba, 2021). Farmers of this region follow common/ basic agronomical practices for the cultivation of crops. It played a crucial role in guaranteeing agricultural output with better practices in countries such as India, as well as easing concerns that we had reached the point of food excess capacity, which occurs when the population exceeds agricultural production. India has just a little percentage of the world's agricultural area, the country ranks second among agricultural production worldwide.

The objective of the study is to know how agronomic practices affect crop production. To get knowledge about common practices followed by the farmers in this region.

MATERIAL AND METHOD

The study was conducted in Kharar block, district SAS Nagar (Punjab). Three villages were selected randomly (Hasanpur, Kalewal, and Singhpura).
A total of 140 farmers were selected on a random basis for the interview. A total of 58 respondents were selected from village Hasanpur, 45 from Kalewal, and 37 respondents from village Singhpura. A detailed interaction was directed with the farmers regarding their social status, and the Agronomical practices they follow throughout the year. The respondents were interviewed at their homes and in their fields. To cover every aspect regarding the agronomical practices followed by the farmers a questionnaire was prepared to interview the farmers and to analyze each parameter properly in a sequence.
After data collection from respondent, data were classified and analyzed with the help of suitable statistical measures such as percentages, graphical representation, bar graphs, and Pie charts.

RESULT AND DISCUSSION

Major crops grown by the farmers in both seasons:

Sr.no	Parameters	Hasanpur	Kalewal	Singhpura	Overall
	Crop	No. of farmers (%)	No. of farmers (%)	No. of farmers (%)	Percentage %
1	Wheat	58 (100%)	45 (100%)	37 (100%)	100%
2	Paddy	58 (100%)	42 (93%)	37 (100%)	98%
3	Sugarcane	22 (38%)	15 (33%)	10 (27%)	34%
4	Maize	30 (52%)	17 (38%)	14 (38%)	44%
5	Sorghum	52 (90%)	40 (88%)	33 (90%)	89%
6	Barseem	50 (86%)	39 (86%)	32 (86%)	86%
7	Cauliflower	31 (53%)	22 (49%)	20 (54%)	52%
8	Cabbage	17 (29%)	14 (31%)	15 (40%)	33%
9	Mustard	26 (46%)	25 (55%)	13 (35%)	46%
10	Tomato	27 (46.%)	18 (40%)	18 (30%)	45%

Table.1: Represents the crop distribution in percentage of respondents

As per the data collected overall, 100% of farmers grow wheat and about 98% of respondents grows paddy crop in their fields. Apart from these two crops around 52% of farmers grow cauliflower crop in their fields overall 46% of farmers cultivate the mustard crop. Crops like potato, sugarcane, chili, and pulses were grown less in this region. Sorghum and berseem are the two major fodder crops of respective seasons that are mainly cultivated in this region. About 89% of respondents grow sorghum and about 86% of the respondents grow berseem as a fodder crop in their fields.

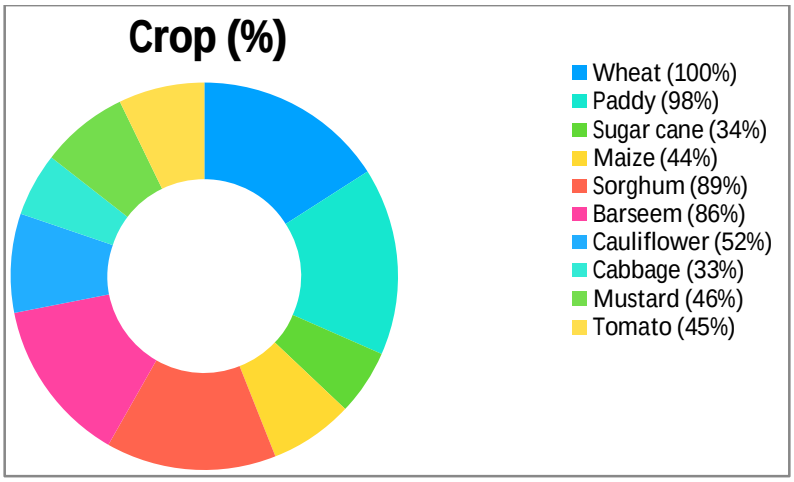
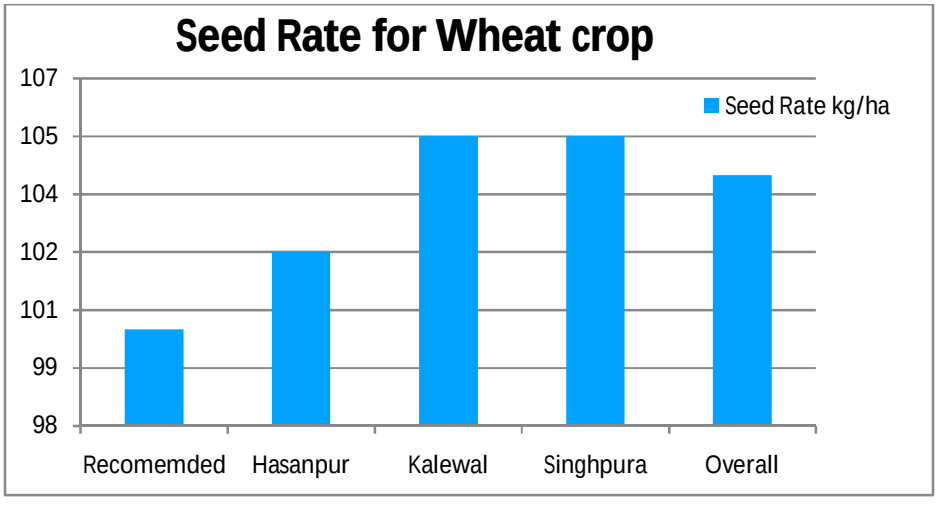


Fig.1: Depicts the crop distribution percentage of various crops grown by the respondents

Seed Rate followed by the Respondents:



Graph 1: Represents the seed rate followed by the farmers in wheat crop

As seen above most of the farmers follow recommended rate set by the agricultural department for seed sowing. Only 2% extra of the recommended seed rate is used for sowing wheat crop in village Hasanpur whereas villages Kalewal and Singhpura use 5% extra than the recommended seed rate for sowing. On average about 4% extra seed is used than the recommended dose for sowing of wheat crop.

Fertiliser dose applied by the respondents:

As per table (Table 1), only wheat and paddy are the two main cereal crops and cauliflower is the only major vegetable crop grown in these villages. Data collection regarding nutrient management is concerned with these crops only.

Sr.no	Parameters	Hasanpur	Kalewal	Singhpura	Overall %	Recommended / ha
Wheat						
1	Urea/ ha	300kg/ha	275 kg/ha	315kg/ha	296.7kg/ha	120 N
2	DAP/ ha	250kg/ha	187 kg/ha	200 kg/ha	212kg/ha	60 P
3	Potassium/ ha	-	-	-	-	40 K
Paddy						
1	Urea/ ha	325kg/ha	300 kg/ha	300kg/ha	308kg/ha	125 N
2	DAP/ ha	187kg/ha	150kg/ha	125kg/ha	154kg/ha	30 P
3	Potassium/ ha	-	-	-	-	30 K
Cauliflower						
1	Urea/ ha	250 kg/ha	250 kg/ha	200 kg/ha	233 kg/ha	125 N
2	DAP/ ha	250 kg/ha	225 kg/ha	225 kg/ha	233 kg/ha	60 P
3	Potassium/ ha	125 kg/ha	125kg/ha	125kg/ha	125 kg/ha	60 K

Table2: Represents mean value of N:P:K amount applied by the respondents

This table depicts that the overall mean amount of fertilizers used by the respondents are more than the recommended dose. The recommended dose for the wheat crop is (120N: 60P: 40K), recommended dose for the cauliflower crop is 125N: 60P: 60K, and recommended dose for the paddy crop is 125N: 30P: 30K. The use of imbalanced fertilizer can be seen according to the data collected. Less importance is given to the potassic fertilizers whereas more emphasis is given on the nitrogenous fertilizers followed by phosphoric fertilizers but most of them are unaware of the soil N, P, and K requirements.

Major weed observed throughout year:

Sr. No	Name	Crop	No. Of farmers (Overall Percentage)
Major weeds			
1	*Echinochloa crus-galli*	Paddy	136 (97%)
2	*Cyperus rotundus*	Paddy	103 (73%)

3	*Amaranthus viridis* Hook. F.	Cauliflower	56 (40%)
4	*Chenopodium album* L.	Cauliflower	63 45%
5	*Phalaris minor*	Wheat	138 (98%)
6	*Avena ludoviciana*	Wheat	115 (82%)

Table 3: Major weeds observed by the respondents

Sr. no	Parameters	Crop	Hasanpur No. of farmers (%)	Kalewal No. of farmers (%)	Singhpura No. of farmers (%)	Overall (%)
Plant Diseases						
1	Sheath blight	Paddy	40 (69%)	32 (71%)	27 (72%)	70%
2	Dwarf Plant disease	Paddy	42 (72%)	29 (64%)	25 (67%)	68%
3	Yellow rust	Wheat	42 (72%)	30 (66%)	26 (70%)	70%
4	Loose smut	Wheat	20 (34%)	18 (31%)	12 (32%)	36%
5	Black rot	Cauliflower	14 (24%)	18 (40%)	10 (27%)	30%
Insect/ pests						
1	Grasshopper	Paddy	56 (96%)	39 (86%)	34 (92%)	92%
2	Leaf folder	Paddy	41 (71%)	20 (44%)	13 (35%)	53%
3	Aphids	Wheat	35 (60%)	30 (66%)	22 (60%)	62%
4	Bettle	Wheat	25 (43%)	19 (42%)	18 (49%)	44%
5	Borers	Cauliflower	21 (36%)	14 (31%)	8 (22%)	31%

Table 4: Depicts the major insects and pests observed by respondents

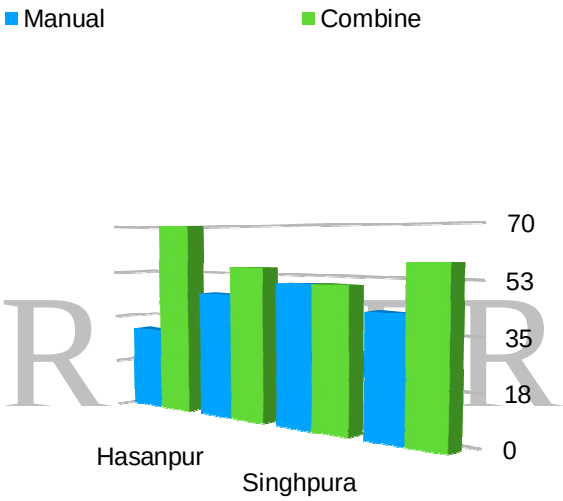
As seen in the above (Table 3) different kinds of weeds (Crop specific) are present in their fields throughout the year. *Phalaris minor* is the major weed witnessed by all the respondents (98%). According to them, this weed shows resistance to most of the chemicals used to eradicate or

eliminate this weed. It reduces the yield up to a significant level. This is the major concern of the farmers during the Rabi season, especially in wheat crop. Another major weed is swank (*Echinochloa crus-galli*) which is faced by around 97% of respondents in the paddy crop, Kharif season.

As per the table (Table 4), about 70% of the respondents observed the disease of Sheath Bligh in paddy crop and yellow rust in wheat crop. These two diseases reduce the crop yield as well as the quality of the grains. Another major disease which was faced by the farmers was dwarf paddy plants. About 68% of the respondents witness this disease in their fields.

Apart from this, about 92% of farmers witness Grasshopper insect in the paddy crop. In the village of Hasanpur, 96% of farmers witness the presence of this insect in their fields. Another pest is the major pest of the wheat crop, faced by 62% of farmers was aphids. About 66% of respondents of village Kalewal faced yield losses due to aphid infestation in their wheat fields. The major pest which affects the yield is Borer in the cauliflower crop i.e (31%), which is the major pest of all Cole crops.

Harvesting Methods:



Graph 2: Represents the data regarding crop harvesting method

As per the data collected most of the farmers prefer to combine harvesters for the harvesting of the cereal crops such as Wheat and Paddy. As it consumes less time and also does not require labor. About 58% of respondents use combine harvesters for the harvesting of wheat and paddy crop whereas only 42% of respondents go for manual harvesting. About 70% of the respondents from Hasanpur prefer harvesting by the combine and only 30% of farmers prefer manual harvesting. In the case of paddy farmers generally prefer manual harvesting of varieties like Basmati, 1121, etc. as the grains of these varieties are long and thin. So to avoid any damage to the grains farmers do manual harvesting.

Yield Record:

Sr. no	Crop	Hasanpur	Kalewal	Singhpura	Overall
1	Wheat	55 qtls/ha	50 qtls/ha	52 qtls/ha	52.3 qtls/ha

2	Paddy	72.5 qtls/ha	77.5qtls/ha	75qtls/ha	75qtls/ha
3	Cauliflower	240qtls/ha	237.5 qtls/ha	225 qtls/ha	243 qtls/ha

Table 5: Depicts the Yield of the major crops grown by the respondents

As per the table, (Table 5) average yield of the wheat crop is around 52 QTLs per acre, Village Hasanpur has the highest productivity (55 QTLs) in the case of wheat crop whereas village Kalewal has the lowest productivity (50 QTLs) rate in wheat crop. But village Kalewal has the highest productivity of paddy crop and village Hasanpur has the least productivity rate (72.5 QTLs) and overall production is about 75 QTLs/ha. The average production of cauliflower is 243 QTLs/ha and village Hasanpur has the highest productivity (240 QTLs).

CONCLUSION

Based on findings and the data collected it is concluded that a variety of crops are grown in this region (Wheat, paddy, sugarcane, maize, mustard, cauliflower, carrot, cabbage, sorghum, berseem, etc). Wheat and paddy are the two main cereal crops and cauliflower is the major vegetable crop cultivated in this area whereas Cabbage, tomato, onion and garlic are also grown. Most of the farmers use an average of 4% more amount of seed than the recommended seed rate. Mainly farmers apply an excess amount of DAP and Urea in their fields whereas less emphasis is given to Potassic fertilizers such as MOP. The major source of irrigation is tube wells and flood irrigation is applied by the farmers for every crop. The major weed observed in this area is Phalaris minor commonly known as “Gulli danda” in the Punjabi language. This is mainly due to not adopting crop rotation practices by the farmer in their fields. Dwarf plant disease in paddy crop is also witnessed by the farmers. Harvesting is mainly done by combine harvester (58% overall) in the case of cereal crops whereas manual harvesting is done in mustard, and vegetable crops such as cauliflower, carrot, tomato, etc. The average yield of paddy is around 75qtls per hectare in this region, and the average yield of wheat crops is about 52 QTLs/ha which demonstrates that proper agronomic practices are followed by the farmers.

All in all, it is concluded that the majority of the farmers follow only one main cropping pattern i.e Wheat- paddy, which results in weed, disease, and insect/ pest infestation. This also results in resistance towards the plant protection chemicals applied by the farmers to control disease and pests. To overcome these problems farmers should follow multiple cropping patterns according to agro-climatic zones and seasons. Paddy is the major Kharif season crop grown in this region, which results in the reduction of groundwater level as 3000- 5000 liters of water is required to produce 1 kg of rice. Farmers should adopt crop diversification techniques instead of growing paddy farmers can grow some other crops during the Kharif season for example Maize. Maize can be used as a cereal crop as well as a fodder crop. Even pickles can also be prepared from the grains of maize crop which will lead to value addition of the product and can be sold at a high market price, which aids in extra income generation for the farmers. Even farmers should adopt the Direct seeded rice method to cultivate paddy crop as this sowing technique requires less water as compared to the transplanting method. Farmers are less aware of soil testing and give less importance to soil testing, imbalance use of fertilizers is observed in this region. More priority is given to Nitrogenous and phosphatic fertilizers. Farmers should go for soil testing at regular intervals so that they stay updated regarding their soil health and macro & micronutrient status and should provide the optimum amount of nutrients required for the crop according to the soil nutrient status. Shifting towards these kinds of agronomical practices can enhance productivity as well as economic status.

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