www.ThePharmaJournal.com

The Pharma Innovation

Harpal Singh
Associate Professor, Department of Agroforestry, UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

Shreya Verma
UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

Harsh Kamboj
UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

Mukul Dutt
UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

Aastha Dureja
UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

Akash Dalai
UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

Socio-economic status for qualitative and quantitative assessment towards crop diversification and sustainable agriculture under different components Punjab

Harpal Singh, Shreya Verma, Harsh Kamboj, Mukul Dutt, Aastha Dureja and Akash Dalai

DOI: https://doi.org/10.22271/tpi.2022.v11.i12So.17671

Abstract
The study is based mainly on primary data collected through socio-economic survey schedule from nearby villages of Kharar town falling under Municipal Corporation of Sahibzada Ajit Singh Nagar (Mohali) Punjab. Different components of socio-economic survey include socio-economic status soil agronomic practices cropping status and soil sampling to achieve the target of qualitative and quantitative data for Crop diversification, economic status and socio-economy of farmers from Punjab. There were various parameters related to cropping pattern, livestock production and other suitable parameters related to Agriculture farming for the livelihood status and economic viability. The study was conducted under Rural Agricultural Work Experience programme by the students of Agriculture from University Institute of Agriculture Sciences, Chandigarh University Gharuan (Mohali) Punjab. In this study more than two hundred farmers were involved with proper questionnaire and thorough interaction of students. Questionnaire contains the information about the Socio-economic profile, Crop diversity and economic viability of farmers. Socio-economic profile includes the farmer's family composition, academic qualifications, caste system, income per-cent, and land holding capacity and other important information, social participation, source of information about agricultural information, extension activities. Proper surveys were conducted in which the interaction was done with the farmers at their houses in the form of interview from the survey conducted it is concluded that the literacy rate of the different villages is about ninety per cent. Nearly forty five per cent (45%) of the village farmers are medium farmers and 30% of the farmer's marginal farmers and other farmers have leased the land for farming. About 90% were present on social media platforms and 10% are not present on social media. Besides that main focus was to identifying problem of the area and their solution. Therefore to sustain agriculture and solve some of the visible problems different campaigns rallies and farmers awareness cum training program were organised by our students in collaboration with Krishi Vigyan Kendra, Kurali (GADVASU, Ludhiana) and department of agriculture Punjab by presenting different models various extension activities and providing nourishment at University level. The farmers were addressed for their major crop issues and were made aware about various innovative ideas promoted by Students, KVKs, rural societies and other NGOs. Majority of the farmers are lacking knowledge about latest technologies, rain water harvesting techniques and application of bio-control. Adequate policies prioritization of agricultural components and utmost utilization of resources are prime need.

Keywords: Socio-economy, crop diversification, economic status, livestock, soil-sampling

Introduction

Socio-economic status is paramount consideration for sustainable agriculture in which critical thinking, artificial intelligence and digital technologies are being involved; solutions may be interaction on the basis of questionnaire survey to identify major problems. Some of the prime factors especially socio-economic status, agronomic practices and soil sampling to minimize the challenges faced by the farmers influencing health status (Singh *et al*., 2022) [30]. The present status of the society in the developing nations is briskly moving from undeveloped economy to developed economy along with the development of social conditions (Chandna, 2010) [28]. But at all places these changes are not equal. Majorly the rural areas are very less developed as compared to the urban areas in terms of many aspects like social, economic and cultural. An individual's lifestyle is widely dependent on their economic status (Islam and Mustaquim, 2014) [1]. The most critical sector of Indian economy is Agriculture. More than half of the India's population is still dependent on agriculture as it is the only principle source

Corresponding Author:
Harpal Singh
Associate Professor, Department of Agroforestry, UIAS, Chandigarh University, Gharuan, Mohali, Punjab, India

of their income and raw material for a big number of industries. A vital role being playing by agriculture sector is to reduce rural and aggregate poverty, socioeconomic advancements and Sen, 2014) [2]. The Crop diversification has great potential as an economic driver inside the agricultural sector. It has also become essential for attaining higher output growth, expanding farm in-come, creating jobs, conserving precious soil and water resources, consumer preferences for high-value, nutrient-dense foods, rural livelihood, sustainable use of natural resources, and poverty alleviation It can be influenced by socioeconomic, soil and agronomic, agricultural inputs, productivity, international trade, and climatic factors, all considered in this study (Anuja*et al*., 2022) [5].

Materials and methods
The study was conducted in Chandigarh University. There were total 60 students (from University of Agricultural Sciences, Chandigarh University), were divided into groups of 5 student in each group and conducted a survey for the socioeconomic, Crop diversification and Economic Viability of farmers under the RAWE programme at three villages Hasanpur, Kalewal and Singhpura, district SAS Nagar (Punjab). Pre-structured classes were schedule to prepare the questionnaire for the survey to collect the data covering the objectives of the study. Collected data were analysed by using frequency and percentage. Each student needs to interact with 20 farmers. An interview schedule method to conduct this survey successfully. In this, we had prepared a questionnaire in which we had to gather all the information about the socio-economic profile of the farmer, agronomic practices, soil sampling and livestock management (Mandeep*et al*., 2009) [8].

Result and Discussion
The survey showed that almost all the farmers have their phones connected to the internet. The farmers who have their families involved in the farming along with their wives constitute about 52% of the villages (based on 100 farmer's data). Some farmers do not want their children to be involved in farming because of the narrow future traditional farming holds. In terms of land holdings, majority of farmers i.e.: 74% have lands in between 1-10 acres and 15% have more than 10 acres. Farmers with land less than 1 acre constituted about 11%. The farm machinery which is used in farming is on sharing basis through a cooperative society amongst 62% farmers and 38% farmers owned their own farm equipment's and machinery. The information sources of the farmers were friends/relatives (72%), input dealers (15%), smart phones (10%) and newspapers (3%) (Gummagolmath*et al.,* 2020) [7]. Crops produced are majorly cereal crops. The crops produced

are wheat (97%), rice (99%), fodder (65%) and vegetable crops (48%). On behalf of the survey the percentage of farmers doing seed treatment is 22%, the percentage of already treated seed is 63%, the percentage of not performing seed treatment is 9% and the percentage of unaware farmers is 6% For insect pest management, farmers used techniques like IPM (45%), chemical control (40%) and biological control (15%) (Anuja*et al.*, 2022) [5].

For weed removal, manual method was prominent along with chemical method. Most of the farmers prepared the land with the use of tractors and the numbers of ploughings were two. This cost an average of two thousand rupees per ploughing similar findings has been reported by (Paul *et al.*, 2016) [4]

The soil testing questionnaire revealed that the farmers were not aware about the importance of getting their soils tested. Knowledge of 78% farmers improved after questioning Hasanpur, a growth of 28% was seen in Kalewal and 38% in the village of Singhpura. In the second round of questioning, after showing an informative video to the farmers, we observed that there was an improvement in the knowledge of farmers and they were able to answer these questions more efficiently (Islam and Mustaquim, 2014) [1]

Mostly farmers were having Cow and Buffalo in the livestock status, some were having ox too for the ploughing purpose.On the behalf of the whole survey of the three villages the total percentage of Cow and buffalo is 65 percent and 80 percent respectively while ox percentage was found to be only 10 percent and the percentage of farmers having both is nearly 50 percent (Dhawan*et al.,* 2016) [11].

There are many problems faced by the farmers in management of livestock like high maintenance, lumpy virus, low prices, not knowing proper vaccination schedules and having cattle with low or no milk production. Mostly cows were suffering from Lumpy disease. (Pathania *et al.,* 2022) [12]

In general, the farmers face problems regarding water and electrical supply, government scheme implementation, lack of knowledge, lack of awareness about modern technologies (Kumar and pal, 2019) [3]

Socio personal profile
Socio personal profile of the respondent
On the basis of the surveys performed the socio personal profile is divided into different parameters. The socio personal profile of a farmer includes his\her:

Caste
After performing surveys the data tells that the division of caste is shown in (Fig. 1.1). The people of village were divided in three castes *i.e*., general, OBC, SC\ST
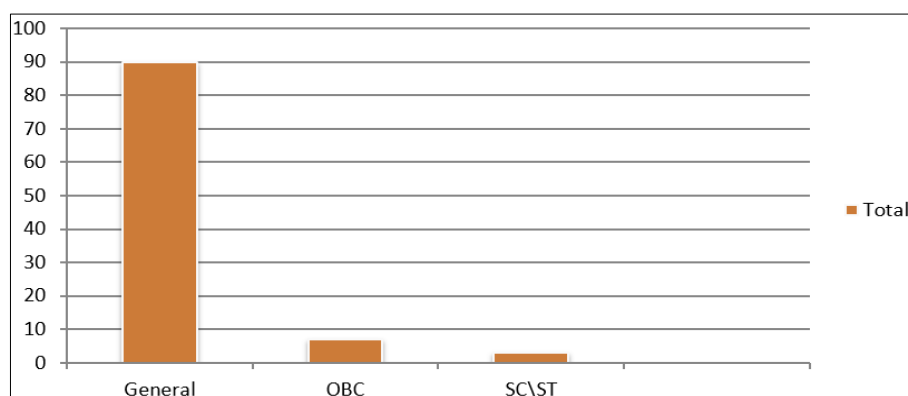

Fig 1: Division of Caste

Most of the farmers near to 90% belongs to general category and 7%belongs to OBC and 3% belongs to SC\ST (Islam and Mustaquim, 2014) [1].

Phone, internet connection& social media presence
After conducting survey, it came to know most of the farmers were having their own mobile phones 85% and very few were there who don't have any mobile phone 15% and about 60% farmers were having internet connection and about 45% were present on social media as shown in (Fig. 1.2) (Thakur and Chander, 2018) [14].
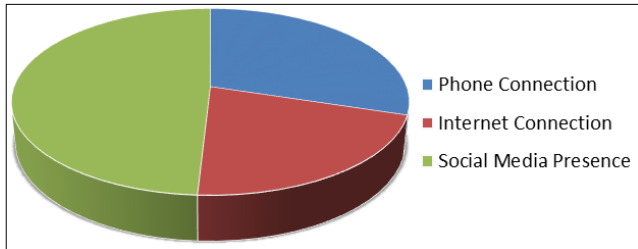
Fig 2: Phone, Internet & social media presence

Family structure
After overviewing the survey, study revealed that 70% of the farmers are living in joint family and 30% are living in nuclear family as shown in (Fig.1.3)(Singh *et al.,* 2017) [9].
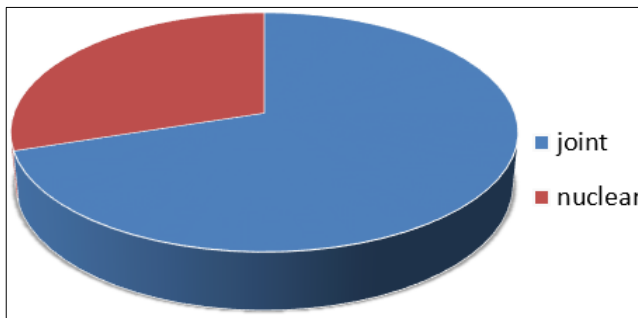
Fig 3: Family structure

Academic qualification
The Academic qualification of the different villages was satisfactory and the percentage of matriculate is 68%, the percentage of 12Th passed is 22%, the percentage of graduate is 4% and the percentage of illiterate is 6% as shown in (Fig.1.4) (Ghuman, 2008) [29].
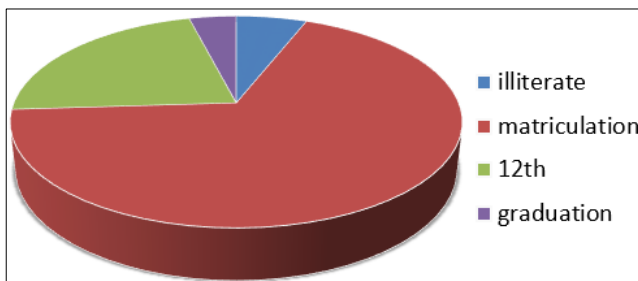

Fig 4: Academic qualification

Land holdings
Perusal data from survey reported that nearly 20% of the farmers have less than 3acres of land, 45% have 3-5 acre of land, 18% have 5-10% acre of land and 17% have 10-15 acre of land as shown in (Fig. 1.5) (Srivastava *et al.,* 2017) [17]
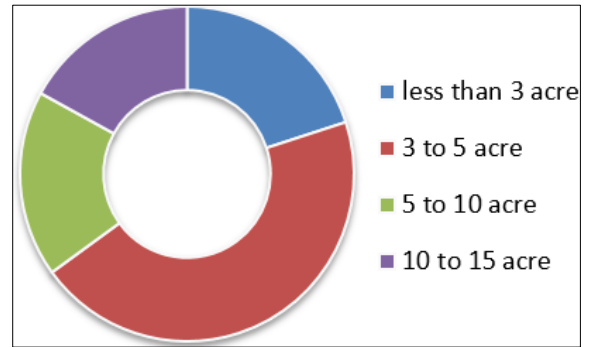

Fig 5: Land holdings

Agronomic practices
The Agronomic Practices is further divided into different parameters so as to get the status of the crops, production and yield of the crops.

Crop grown status
The crop grown status shows that 97% of the farmers grows wheat,99% farmers grow rice, 65% of the farmers grows bajra,53% of the farmers grow Chari and 48% of the farmer grows vegetables as shown in (Fig.1.6) (Aggarwal *et al.,* 2009) [18].
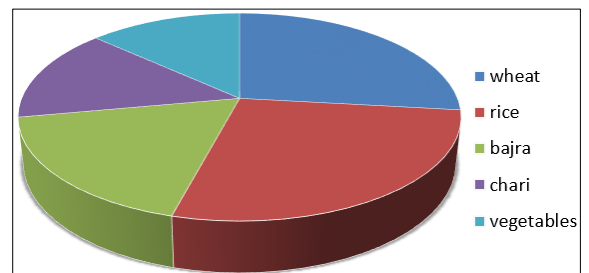

Fig 6: Percent of farmers growing crops

Seed treatment
Seed treatment is important part of crop production. By treating seed with fungicides the seeds are safe from the rodents, birds and pests. On behalf of the survey the percentage of farmers doing seed treatment is 22%, the percentage of already treated seed is 63%the percentage of not performing seed treatment is 9% and the percentage of unaware farmers is 6%asshownin (Fig.1.7) (Kaur and Sharma, 2017) [19].
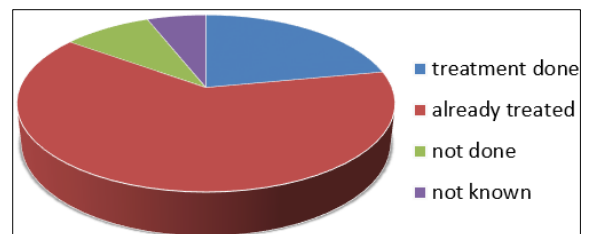

Fig 7: Seed treatment

Irrigation status
For proper growth and good yield of a particular crop its proper and perfect irrigation is necessary. One must know about the right stages of irrigation for the crop grown. After survey I came to know that the percentage of farmers aware about the perfect irrigation stages is 20% and 80% are not aware about this as shown in (Fig.1.8) (Sarkar, 2020) [20]
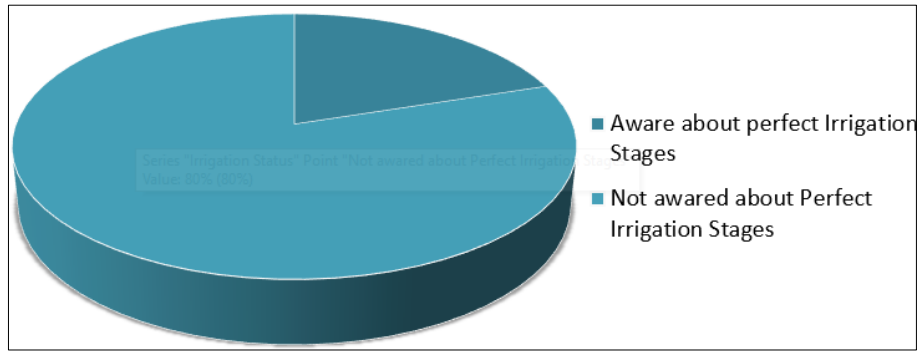
Fig 8: Irrigation status

Weed management

Weeds are the plants that grow by their own in the field without showing them and then these plants competes with the main crop for the sunlight, nutrients and space. The management of weeds is very much important in order to have good yield of the produce. By the survey I came to know (Table 1):

Table 1: Weeds Management Methods

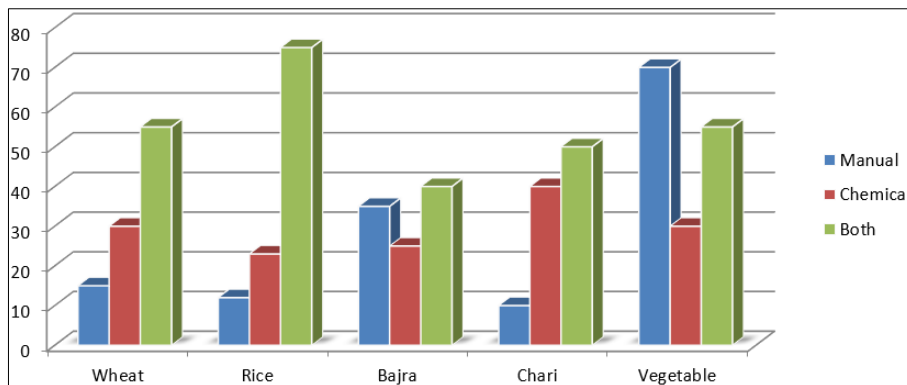| Crop Name	Manual Control	Chemical Control	Both
Wheat	15%	30%	55%
Rice	12%	23%	75%
Bajra	35%	25%	40%
Chari	10%	40%	50%
Vegetable	70%	30%	55%

Fig 9: Weed management according to different crops grown

Pest management

In this part farmers were asked about the major pest of the crops they had grown and about the management strategy that they opt for the management of the same. On the basis of survey we came to know that in case of wheat the major pest is Thrips and about 95% farmers do chemical control for the same, 20% goes for Manual control and 10% goes for Biological Control. In Rice 98% do chemical control, 15% manual control and 5% biological control. In cauliflower 85.5% Chemical, 25% manual and 10% biological control. In Bajra 98% chemical control, 14% manual control and 5% biological control as shown in (Fig 1.10) (Singh *et al.,* 2008) [21].
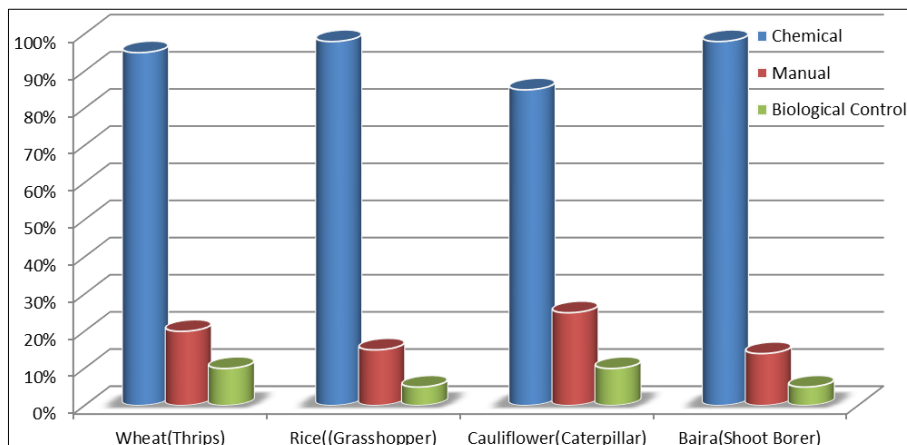

Fig 10: Pest control methods according to different pests found in different crops

Yield loss parameter

There are many parameters that are responsible in the yield loss of the particular crop. But on the behalf of the survey performed the major parameters that are responsible in the yield losses in the three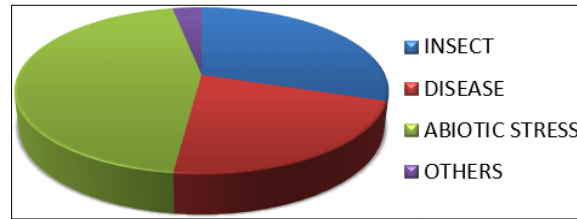 villages are shown in (Fig.1.11), about 30% loss is due to insect pests, about 22% losses is due to diseases, about 45% of the yield losses is due to Abiotic Stresses and 3% yield losses is due to other reasons (Kumar and Parikh, 2001) [22]

Fig 11: Causes of yield loss

Soil sampling

Soil testing is very important to know the characteristics of the soil. Soil sampling contained some questions about the soil and its testing.The soil sampling section was performed to check the knowledge level of the farmer regarding the soil testing. In this part 11 questions were asked from the farmer before showing them the knowledgeable video to check their knowledge and once they answer the questions they are checked by us and then we show the video to the farmer which is on soil testing, again the same questions are asked and both the responses before and after are compared to check the knowledge level of the farmer and to check what he has gained from the video as shown in (Fig.1.12)about 20% passed before awareness and 80% failed before awareness and (Fig. 1.13) here 78% passed after awareness and 22% still failed (Verma *et al.,* 2005) [23].
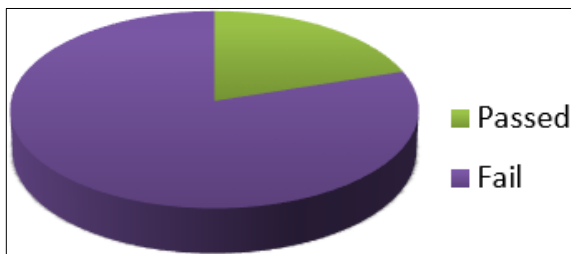

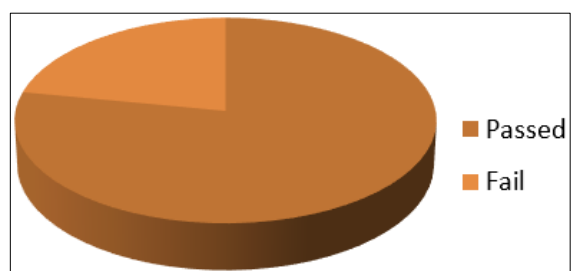**Fig 12:** Before showing video

Fig 13: After showing video

Livestock management

Livestock have provided crucial contributions for the human wellbeing in social and economic terms since the time of civilisation and domestication of animals. Livestock systems have drastically evolved since then and in light of global challenges such as climate change, population growth and the urgency of ensuring the availability of nutritious and secure food for everybody, the optimisation of sustainable livestock production is more important than ever. Sustainable livestock production means making livestock systems economically more efficient and striking balance between meeting the growing demand of animal-origin products and reducing to the minimum the negative side effects and externalities from the livestock sector (Rahman and Saidur, 2015) [24].

Socio physiological profile

The survey for the livestock was also done to gain knowledge about the livestock sector too along with crop production and Socio Personal Profile (Kaur *et al.,* 2020) [25].

Start of dairy farming

In this section the farmers were asked that what was the reason for the start of the dairy farming, the percentage chart is shown in (Fig 1.14).
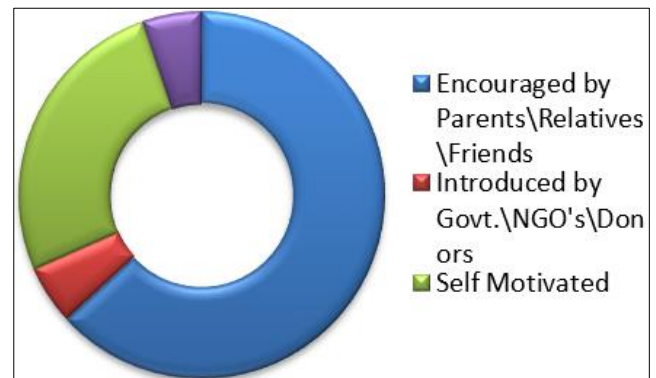

Fig 14: Start of dairy farming

Total number of animals having farmers

Mostly farmers were having Cow and buffalo in the livestock, some were having ox too for the ploughing purpose. On the behalf of the whole survey of the three villages the total percentage of Cow is 65%, percentage of Buffalo is 80%, Percentage of Ox is 10% and the percentage of farmers having both is 50% as shown in Fig.1.15.
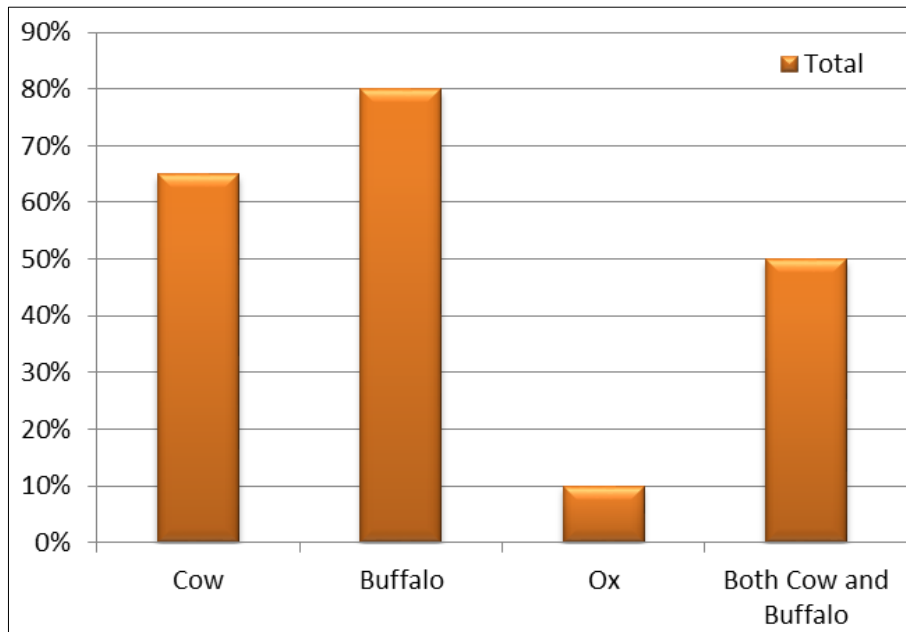
Fig 15: Percentage of different livestock animals owned by the farmers

Knowledge about management of the livestock
On the basis of the survey performed I came to know that the percentage of farmers having shed is 98%, the percentage of farmers maintain record books is 10%, the percentage of farmers doing disinfection of the cattle sheds is 80%, the percentage of farmers doing Summer Management is 99%, the percentage of farmers doing Winter Management is 98% and the percentage of farmers having contact with veterinary doctors is 60% as shown in (Fig.1.16) (Kaur *et al.,* 2017) [26].
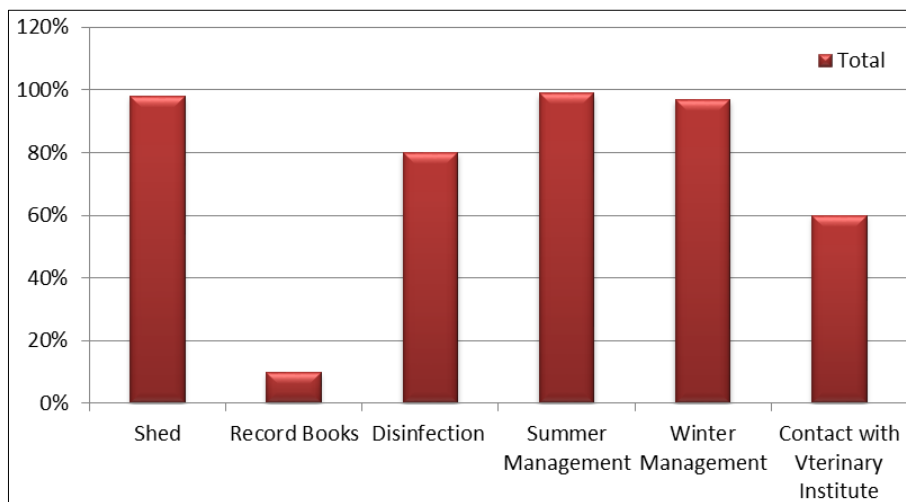

Fig 16: Livestock Management

Clean milk production
Cleanliness before milking
Cleanliness is most important part of the milk production is cleanliness. On the basis of survey, we came to know that about 100% of the farmers perform this step before milking.

Method of milking preferred
Farmers use different methods of milking, on the basis of the survey performed I came to know that percentage of full hand Milking followed by Stripping is 52%, percentage of full hand milking is 29%, percentage of striping method is 12% and the percentage of knuckling method is 7% as shown in (Fig1.17) (Mohi and Bhatti, 2006) [27].
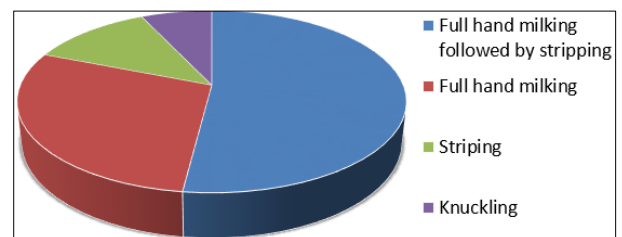

Fig 17: Milking methods

Conclusion
The paper has glanced into the status of the farmers of SAS Nagar in aspect of the qualitative and quantitative aspects and

into the status and trend of agriculture diversification across different villages of Kharar, SAS Nagar (Mohali). The people of village are divided in three castes *i.e*., General, OBC, SC\ST. Most of the farmers near to 90% belong to general category and 7% belongs to OBC other 3% belongs to SC\ST. After over viewing the survey, we came to know that 70% of the farmers are living in joint family and 30% are living in nuclear family. The academic qualification of the different villages was satisfactory and the percentage of Matriculate is 68%, the percentage of 12Th passed is 22%, the percentage of graduate is 4% and the percentage of illiterate is 6%.The crop grown status shows that 97% of the farmers grow wheat, 99% farmers grow rice, 65% of the farmers grow bajra, 53% of the farmers grow Chari and 48% of the farmers grow vegetables. Alongside it has analysed the impact of agricultural diversification on farm income. The above analysis indicates that the study suggests that there is need to promote the participation of farmers, particularly females in agricultural training.

Acknowledgement

References
1. Islam MDM, Mustaquim MD. Socio economic status of rural population an income level analysis. Asian academic research Journal of Multidisciplinary. 2014;1(24):98-106.
2. Raghav S, Sen C. Socio economic status of farmers and their perception about technology adoption: a case study. International Journal of Economic and Business review. 2014;2(3):7-13.
3. Kumar Raj, Sangeet. Economic viability of crop diversification in Punjab. J krisivigyan. 2019;8(1):55-62.
4. Paul S, Laha A. Kuri P. Crop diversification and its implications to food security: A case study of India with special reference to West Bengal. Asia-Pacific journal of rural development. 2016;26(1):61-84.
5. Anuja RA, Shivaswamy PG, Ray M, Singh NK. Pattern of crop diversification and its implications on under nutrition in India. Current Science. 2022;122(10):1154-1160.
6. Goud Sudhakar R, Anuradha T, Kamraju M, Vani M. Socio-economic conditions of farmers: A case study of Warangal district. International journal of engineering research-online. 2017;5(4):158-163.
7. Gummagolmath CK, Bhawar SR, Lakshmi Ramya BS, Patra Priynka. Impact of crop diversification on farmers socio-economic conditions of the farmers: A case of Himachal Pradesh. Research journal of agricultural sciences. 2020;11(1):137-143.
8. Singh Mandeep, Bhullar SA, Joshi SA. Factors influencing economic viability of marginal and small farmers in Punjab. Agricultural economics research review. 2009;22:269-279.
9. Singh Gurdarshan, Dhillon SB, Grover KJ. Productivity, profitability and economic viability of a diversified farm in Faridkot district of Punjab, India. International journal of current microbiology and applied sciences. 2017;6(6):2463-2467.
10. Sen Biswajit, Venkatesh P, Jha K Girish, Singh RD, Suresh A. Agricultural diversification and its impact on farm income: A case study of Bihar. Agricultural economics research review. 2017;30(2017):77-88.
11. Dhawan V, Kashish. Transforming livestock economy in India with special reference to Punjab: A review; c2016 Jun. p. 259-271. DOI:10.5958/0976-4666.2016.00034.6
12. Pathania A, Mishra A, Singh Y. skin disease: Emerging concern for livestock owners: A review College of Animal Biotechnology, Guru Angad Dev Veterinary and Animal Science University, Ludhiana-141004, Article; c2022. DOI: 10.18805/BKAP594
13. Kumar N, Pal N. Existence of Barriers and Proposed Recommendations for the Development of Renewable Energy in Indian Perspective Journal of Environment, Development and Sustainability. 2020;22:2187-2205. Published: 29 October 2018
14. Thakur D, Chander M. of Social Media in Agricultural Extension: Some Evidences from India, International Journal of Science, Environment and Technology. 2018;7(4):1334-1346.
15. Riar TS, Gill JS. Integrated Farming Systems and Socio-economic Characteristics of Punjab Agricultural University Awardee Farmers Ravinder Singh, Asian Journal of Agricultural Extension, Economics & Sociology. 2017;16(3):1-5. Article no. AJAEES.30054 ISSN: 2320-7027.
16. Asian Journal of Agricultural Extension, Economics & Sociology 2017;16(3):1-5. Article no.AJAEES.30054 ISSN: 2320-7027. Published By: Economic and Political Weekly.
17. Srivastava SK, Chand Ramesh, Singh Jaspal, Kaur Amrit Pal, Jain Rajni, Kingsly I, *et al*., Current Science Association Revisiting groundwater depletion and its implications on farm economics in Punjab, India. 2017;113(3).
18. Aggarwal R, Kaushal M, Kaur S, Farmaha B. Water resource management for sustainable agriculture in Punjab, India. Water Sci Technol. 2009;60(11):2905-2911. https://doi.org/10.2166/wst.2009.348
19. Kaur A, Sharma M. Level of Recommended Agricultural Practices by Punjab Farmers. Department of Economics and Sociology, Punjab Agricultural University, Ludhiana 141 004 (Punjab); c2017.
    DOI: 10.5958/2349-4433.2017.00039.3
20. Sarkar A. irrigation and farm power policies in Punjab and West Bengal: Challenges and opportunities. Department of Geography, Delhi University, Delhi. Published on; c2020 Mar 20.
21. Singh A, Vashisht AK, Kumara R, Das DK. Adoption of Integrated Pest Management Practices in Paddy and Cotton: A Case Study in Haryana and Punjab. Agricultural Economics Research Review. 2008;21:221-226. DOI: 10.22004/ag.econ.47675.
22. Kumar KSK, Parikh J. Socio-economic Impacts of Climate Change on Indian Agriculture, International Review for Environmental Strategies. 2001;2(2).
23. Verma VK, Patel LB, Toor GS, Sharma PK. Spatial distribution of macronutrients in soils of arid tract of

Punjab, India. International Journal of Agriculture and Biology. 2005;7(2):295-7. 1560–8530/2005/07–2–295–297. http://www.ijab.org.

24. Rahman Saidur. Green Revolution in India: Environmental Degradation and Impact on Livestock AsianJournal of Water, Environment and Pollution. 2015;12(1):75-80.

25. Kaur M, Ravita Singh K. Socio-economic Characteristics of Farmers in Rural Punjab: An Inter-Category Analysis. 2020;16(1):31-42.
DOI: https://doi.org/10.35716/ijed/19136.

26. Kaur S, Verma HK, Singh J, Dash SK, Kansal SK. Knowledge Level of Women Dairy Farmers about Various Farming Practices in Border Area of Punjab, Kansal1 Journal of Animal Research. 2017 December;7(6):1051-1059.
DOI: 10.5958/2277-940X.2017.00157.7

27. Mohi AK, Bhatti JS. OF Improved Dairy Farming Practices by Members of Punjab Dairy Farmers Association. Dairying, Foods: H5. 2006;25(1):55-58.

28. Chandna RC. Geography of population: Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi; c2010. p. 313.

29. Ghuman AS, Bar M, Dobbins IG, Schnyer DM. The effects of priming on frontal-temporal communication. Proceedings of the National Academy of Sciences. 2008 Jun 17;105(24):8405-9.

30. Singh Harpal, Nagpal P, Dafouti A, Nanda HB. Socio-economic profile: A tool for improving cultural and economic status of farmers from SAS Nagar (Mohali) district Punjab. The Pharma Innovation Journal. 2022;11(12S):831-834. DOI:
https://www.thepharmajournal.com/archives/2022/vol11issue12S/PartK/S-11-11-327-199.pdf