Constraints in Adoption of Intercropping in Horticultural Crops Among Farmers of Haryana

ABSTRACT

Intercropping can also be referred to as mixed cropping or Polyculture i.e., cultivating two or more crops in the same space at the same time. The present research was conducted in Haryana state to know the reasons for adoption as well as constraints in adoption of intercropping. The study was conducted in four districts of Haryana namely Bhiwani and Hisar from the dry zone and Karnal and Kaithal from the wet zone of Haryana. Further, two blocks were selected randomly from each district and from each block 15 respondents were selected randomly from clusters of villages. Hence, a total of 120 respondents were selected for the purpose of the study. The study revealed that the major reasons for the adoption of intercropping were higher income, better utilization of natural resources, improved socio-economic status etc. whereas major constraints in adoption of intercropping were no MSP for horticultural crops, lack of storage facilities, harvesting problems etc. this study recommends introducing of MSP for horticultural crops and there should be facility of storage for farmers .

Comment [D31]: Not justifies the exact reasons for non adoption of intercropping

Key words: Constraints, Adoption, Intercropping, Horticulture, Farmer

Introduction

Agriculture plays a major role in developing countries by contributing to important sectors, i.e., filling the food basket of a country and providing raw materials for industries. But in the 21st century, the pressure on agriculture and its allied activities is continuously increasing, as the population of the world has increased rapidly and due to the increased population and development of urban clusters along with industrial growth in the developing countries, there is a shrinkage in the availability of land for cultivation and soils around the world are affected by land degradation processes as a consequence of the abuse of grazing, fire, mining, or intensive agriculture (Pereira *et al*. 2017). Agriculture in the next decade will have to produce more food from a smaller area of land through more efficient use of natural resources with minimal impact on the atmosphere to satisfy the growing population demands (Hobbs et al. 2008). So, these recent agricultural problems have forced agricultural planners and development agencies to review the role of multiple cropping systems as a means to enhance agricultural production. The term “cropping system” represents a method of maximum crop production in available land in a cropping cycle with minimum natural resource degradation and the adoption of high-intensity cropping systems may be a viable option to increase agricultural sustainability, productivity and production as a whole (Singh, 2015). Multiple cropping is one of the most necessary practices to enrich the field’s biodiversity. Intercropping is one of the types of multiple cropping system that can be referred as cultivating of two or more crops in the same field at the same time, for example, growing rice + soybean in a 4:2 row ratio i.e., after every 4 rows of rice, 2 rows of soybean is grown. In addition, intercropping holds the promise of providing benefits to small farmers through increased crop yields and income as well as improved resource use (Himmelstein *et al*. 2017). Traditional agriculture, as practised through the centuries all over the world, has always included different forms of intercropping. In fact, several crops have been grown with one another for hundreds of years and crop mixtures probably represent some of the earliest farming systems practiced (Plucknett and Smith, 1986).

India is a tropical country, endowed with multiple climatic conditions and has a diversified agrarian sector. The concept of the cropping system is as old as agriculture in India. The multiplicity

or mixability of cropping systems has been one of the most important aspects of Indian farming and it is mainly attributed to the prevailing socio-economic conditions of the agrarian community (Progressive Haryana, 2019). The greatest challenge of the present time in agriculture in front of a populous country like India is to produce more farm products, namely food, fodder, fuel and fibre to meet the increasing human and animal needs from the limited availability of cultivable land. Under this situation, one of the important strategies to increase agricultural output is the development of high-intensity sequential cropping and intercropping systems (Maitra *et al*. 2019).

Agriculture is also the primary sector of Haryana state and therefore; the majority of the population is somewhat dependent on agriculture and its allied activities. Haryana is known as 'bread basket' of India. Over the years, Haryana state has adopted progressive policies for strengthening the agriculture sector by enhancing investments, promoting research and development system, public distribution system, irrigation development, land acquisition policies, subsidies towards credit and power use, infrastructure like roads, market, power generation and supply, etc. (Progressive Haryana, 2019). The state has a diversified agroecology and cropping systems. The total geographical area of Haryana is 43,71,000 ha, out of which cropped area is 64,71,000 ha and the area under Horticultural crops is 5,28,940 ha which covers around (8.17%) of the cropped area and currently, fruits, vegetables and flowers, are significant horticultural crops developed in Haryana which represents (6.40%) of the total crop region in the state and every possible effort is being made to achieve the target of (10%) area of cultivation under horticulture crops (Kumar *et al*. 2020).

Comment [D32]: Mention source of data

So, looking at the importance of intercropping system, the present study was conducted to find out the major constraints that were faced by the farmers in adoption of intercropping in horticultural crops and to make suggestions on the basis of findings.

METHODOLOGY

The study was conducted in two agro-climatic zones i.e., dry and wet zone of Haryana. Bhiwani and Hisar districts were selected randomly from the dry zone further two blocks Bhiwani and Siwani were selected randomly from Bhiwani district while Hisar I and Hansi I blocks were selected from Hisar district. Karnal and Kaithal districts were selected randomly from the wet zone further two block Gharuanda and Indri were selected randomly from Karnal and Kalayat and Kaithal blocks were selected from Kaithal district. Further, from each block a cluster of villages were selected purposely i.e., villages in which farmers were adopting intercropping (the villages were Chang, Bamla, Chanana, Kaimri, Shyadhwa, Dhanipirwala, Sainipura, Kailram, Batta, Titram, Keorak, Mubarkabad, Bastara, Dhanora Jagir and Bibipur jattan). Thus, 15 respondents were selected from each block and a whole 120 respondents were selected from the 8 blocks of 4 districts. The data were collected with a well-structured interview schedule and were analysed using MS Excel, OP STAT and Statistical Package for Social Sciences (SPSS) for computing frequency, percentage, weighted score and average mean score. Constraint index (CI) was developed as suggested by Angral (2017). This index measured and compared the constraints expressed by different respondents.

Comment [D33]: Give weather parameters like rainfall, temperature and RH etc. in tabular form.

$$CI = VS \times 2 + S \times 1/N$$

Where, VS = Very serious, S= serious, N= total number of respondents

The constraints themselves were classified into 3 sets viz; very serious, serious and not so serious. The Constraint index was recorded on a 1-to-6-point scale, with 6 being the most severe and1 being the least severe.

RESULTS AND DISCUSSION

Constraints in adoption of intercropping system

Comment [D34]: Specify the major intercropping crops/systems of these 4 districts and their yield and economics.

The findings of the present study as well as relevant discussion has been summarized here: The constraints were kept open ended and the responses were noted in the schedule itself. The frequency for each constraint was worked out and converted in to percentage elucidated in Table 1.

Analysis revealed that more than seventy-one per cent of the respondents had considered the constraint 'No minimum support price for horticulture crops' as very serious.

It appears from the Table 1 that half of the respondents (60.00%) had considered the constraint 'Lack of storage facilities at long distance purchase agency' as very serious.

The result presented in the Table 1 showed that the sixty per cent of the farmers had considered the constraint 'Harvesting is difficult' as very serious which were also reported by Nagdanbhai (2012), Sancley and Mazhar (2020).

Comment [D35]: Discussion part is poorly written. There is improper justification given to support results. Needs major improvement.

The table 1 depicts that nearly half of the respondents (59.16%) had considered the constraints 'Expert management' as very serious.

Fifty-five per cent of the respondents had considered the problem of 'labour intensive' as very serious.

More than half of the respondents (55.83%) had faced the problem 'uncompetitive price and sales channels' and considered it as very serious which were also reported by Jirgi et al. (2015) and Yap, et al. (2016).

Comment [D36]: Results and discussion should be more elaborative.

Table 1. Constraints faced in adoption of intercropping

Constraints	Very serious	Serious	Not so serious	WS	AMS	Constraint Index (CI)	Rank
No minimum support price for horticulture crops	86 (71.67)	27 (22.50)	7 (5.83)	319	2.658	1.99	I
Lack of storage facilities at long-distance purchase agency	72 (60.00)	35 (29.17)	13 (10.83)	299	2.491	1.79	II
Harvesting is difficult	72 (60.00)	34 (28.33)	14 (11.67)	298	2.483	1.78	III
It requires more attention and thus increased intensive, expert management	71 (59.17)	35 (29.17)	14 (11.66)	297	2.475	1.77	IV
Labour intensive	66 (55.00)	40 (33.33)	14 (11.67)	292	2.433	1.72	V
Uncompetitive Prices and Sale Channels	67 (55.83)	38 (31.67)	15 (12.50)	292	2.433	1.72	VI
Control of pests, diseases, and weeds are difficult	35 (29.17)	50 (41.66)	35 (29.17)	240	2.000	1.20	VII
Competitive effects among component crops	24 (20.00)	56 (46.67)	40 (33.33)	224	1.866	1.04	VIII
Lack of training infrastructure	21 (17.50)	47 (39.17)	52 (43.33)	209	1.741	0.89	IX

Nonavailability of subsidies	23 (19.17)	40 (33.33)	57 (47.50)	206	1.716	0.86	X
Mechanization is difficult	21 (17.50)	43 (35.83)	56 (46.67)	205	1.708	0.85	XI
Unavailability of technical labour	16 (13.33)	36 (30.00)	68 (56.67)	188	1.566	0.68	XII

Conclusion

Farmers of Haryana who were doing intercropping in horticultural crops had been facing some major constraints i.e., no MSP, uncompetitive price, lack of storage facilities, expert management and labour intensive as major problems and these problems had to be solved so that new farmers can also get motivation to adopt intercropping. This study recommends introducing MSP for horticultural crops and making storage facilities available to farmers so that they can store their produce for some amount of time.

Comment [D37]: Conclusion also needs to be more specific and needs improvement

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