CHAPTER VI

SUMMARY AND CONCLUSION
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Pulses occupy an important place in the agricultural economy of India. They are the rich source of protein to the human beings and of nitrogen to the soil. They have some unique and distinct feature as compared to other cultivated crops. For example;

i) Provide protein in human food and cattle food.

ii) Serve as soil-fertility restores by fixing atmosphere nitrogen in the soil.

iii) Can be grown as bonus crop under unirrigated condition, which otherwise remain fallow.

iv) Grown in round the year cropping patterns.

v) Improve soil texture and structure.

vi) Provide fuel for cooking purpose.

vii) Conserve moisture and check soil erosion by providing protective cover.

Due to increasing problem of protein malnutrition and rising cost of fertilizers, pulses have assumed added significance in present-day Indian agriculture. The average Indian diet is not only insufficient in calories, it is also unbalanced. Pulses have a serious implication on the nation's future food production requirement. For solving these problems, perhaps, pulses are the cheapest and most practical means at the present stage of our economic development.
There exist a wide gap between the potential yield and harvested yield on farmer's field. It is therefore, necessary to make massive efforts to increase the management efficiency of farmers enabling them to adoption the improved technology so that pulse production could be raised to the level that all types of national requirement of pulses is fulfilled. Hence, considering the importance of pulses in our nation economy as well as human diet on the one hand and its poor production and productivity on the others, the present investigation "A Study of Technological Gap and the Constraints in the Adoption of Pulse Crops Technology among Farmers of District Bulandshahr, U.P." was undertaken with the following specific objectives:

1. To study the level of adoption of pulse technology on farmers field.
2. To examine the magnitude of technological gap in the adoption of pulse technology.
3. To study the relationship and contribution of communication variables towards technological gap of pulse technology.
4. To study socio-psychological factors as determinants of positive or negative attitude towards adoption of pulse technology.
5. To study the constraints coming in the way of adoption of improved technology of pulse production.
6. To develop a suitable extension strategy to bridge the gap in the adoption of pulse crop technology.
Hypotheses

1. There is no relationship between farm size and adoption of practices.

2. There is no relationship between socio-psychological variables of the respondents and their level of adoption of pulse technology.

3. There is no relationship between communication sources used by the farmers and their technological gap.

4. There is no relationship between socio-psychological variables of the respondents and their attitude towards adoption of pulse production technology.

Methodology

The data in the study have been collected from the selected farmers besides 20 V.D.Os from ten randomly selected villages of two C.D. block in district Bulandshahr of U.P. state. In collection of data farmers were personally interviewed with the help of specially prepared schedule whereas V.D.Os were asked to record their views on the schedule. Respondents were classified into three categories of socio-economic traits for tabulation and analysis. The various statistical procedures followed in the present study were: Frequency, percentage, mean, standard deviation, correlation-coefficient, multiple correlation and regression analysis, stepwise forward inclusive regression analysis, Chi-square, 't' test and 'f' test. The major findings of the study are being presented as under:
FINDINGS

1. Profile of respondents

The profile of pulse producing farmers was that majority of them were of adult to young age group. They belonged to backward to upper castes, with low to medium education on having joint families of medium to large size with low to medium social participation and medium to low socio-economic status.

2. Socio-economic factors in relation to size of holding of pulse growers

The analysis reveals that except age rest of all seven variables i.e. caste, education, type of family, size of family, social participation, socio-economic status and level of adoption had significant relationship with the size of holding. The significant relation indicated that the size of holding has its influence on socio-economic factors of a farmer.

3. Level of adoption

An attempt was made in the present investigation to find out the level of adoption of the recommended pulse production technology among the respondents grouped as: marginal, small and others on the basis of their land holdings. The summary on each group are separately being presented in the following paragraphs:

Out of the ten practices studies for their level of adoption marginal farmers had assigned first three ranks to: interculture 94.7%, irrigation 86.3% and seed rate 90.50% while the practices that received the lowest ranks were: rhizobium culture 08.4%, seed treatment 18.9%
and plant protection 29.04%.

When the relationship between the adoption level and socio-psychological variables of the marginal farmers was worked out, it was found that only caste, family size and knowledge had positive and significant relationship while age had significant but negative correlation. All the variable taken together, explained 74.65 per cent variability in adoption level. Only two variables i.e. age and knowledge have made significant contribution towards gap in adoption because both accounted for 73.77 per cent variation in adoption. Contribution of other variables towards the adoption of pulse technology was almost negligible.

With respect to adoption level of the small farmers it was found that they had assigned highest ranks to the practices such as: fertilizers, interculture and irrigation which were adopted by 78.3%, 91.6% and 90.0% of the respondents respectively. Whereas the practices that receive the lowest ranks were: rhizobium culture 16.6%, seed treatment 30.0% and plant protection 33.3%.

Adoption of pulse technology was significantly and positively correlated with caste, education, social participation and knowledge, whereas age and family size were negatively but significantly correlated. All the variables taken together explained 78.00 per cent variability in adoption level. Only three variables i.e. age, caste and knowledge have made significant contribution towards gain in adoption, because these accounted for 76.95 per cent variation in adoption. Contribution of other variables towards the adoption of pulse technology was almost negligible.
With respect to adoption level of the other farmers it was found that they had assigned highest ranks to the practices such as: interculture, seed rate and irrigation which were adopted by 91%, 97% and 93% respondents respectively. Whereas the practices that received the lowest ranks were: rhizobium culture 11.10%, seed treatment 33.3% and plant protection 44.0%.

Adoption of pulse technology were significantly and positively correlated with education, social participation, socio-economic status and knowledge. Whereas age was negatively but significant correlated. All the variables taken together explained 47.20 per cent variability in adoption level. All variables have non-significant contribution toward gain in adoption but social participation and knowledge both accounted for 40.10 per cent variation in adoption. Contribution of other variables towards the adoption of pulse technology was almost negligible.

When all the farmers were taken together it was found that out of the ten practices studied for their level of adoption all farmers had assigned first three ranks to: interculture 93.00%, irrigation 89.00% and seed rate 93.00%, while the practices that received the lowest ranks were: rhizobium culture 11.50%, seed treatment 25.50% and plant protection 40.00%.

When the relationship between the adoption level and socio-psychological variables of the all selected farmers was worked out, it was found that only caste, education, social participation, socio-economic status and knowledge had positive and significant relationship while age had significant but negative correlation. All the variables taken together,
explained 60.33 per cent variability in adoption level. Only four variables i.e. age, caste, socio-economic status and knowledge made significant contribution towards gap in adoption because these accounted for 60.12 per cent variation in adoption. Contribution of other variables towards the adoption of pulse technology was almost negligible.

4. Technological gap in the adoption of pulse technology

The three types of farmers i.e. marginal, small and other were classified into three different categories of technological gap namely 'Low', 'Medium' and 'High'. The summary on each kind of farmer has been presented as under:

In the case of marginal farmers 52.63% of them were found to be in 'medium' followed by 38.95% and 8.42% in 'high' and 'low' technological gap categories, respectively. The mean technological gap score was worked out to be 39.40%. Further, the standard deviation value of the sample was (S.D.=5.03) showing not much difference within the categories of marginal farmers with the respect to technological gap.

Among the small farmers 43.35% were in 'medium' followed by 35% and 21.66% respondents in 'low' and 'high' technological gap categories, respectively. The mean technological gap score was worked out to be 34.97%. Further, the standard deviation value of the sample was (S.D.=6.74) which mean through there was a wide gap in technology yet within the categories there was not much difference. With respect to other farmers 57.78% were in the 'medium' followed by 35.56% and 6.66%
respondents in 'low' and 'high' technological gap categories, respectively. The mean technological gap score was worked out to be 33.27%. Further, the standard deviation value of the sample was (S.D. = 5.54) which mean through there was a wide gap in technology yet within the categories there was not much difference.

When all the farmers were taken together, it was found that 51% of them were in 'medium' followed by 26.50% and 22.50% in the 'high' and 'low' technological gap categories respectively. The mean technological gap score was worked out to be 36.69. Further, the standard deviation value of the sample was (S.D. = 6.27). In short, it can be stated that there was a wide gap in the adoption of the technologies by the farmers yet the three groups were almost homogeneous in this respect.

5. Relationship and contribution of communication sources towards technological gap of pulse technology

Study reveals that in the case of marginal farmers communication sources were negatively and significantly associated with the technological gap. Communication sources taken together resulted in 34.91 per cent variability in their technological gap which was found to be highly significant (F=49.89).

While in the case of small farmers communication sources were found to be non-significantly associated with the technological gap. Communication sources taken together resulted only in 04.20 per cent variability in their technological gap which was found to be non-significant (F=2.54). Whereas with regards to other farmers it was found that
communication were negatively and significantly associated with technological gap. Communication sources taken together resulted only in 12.57 per cent variability in their technological gap which was found to be significant \( (F=6.15) \).

When taken all the farmers jointly it was found that communication sources were negatively and significantly associated with their technological gap. Communication variable taken together resulted in 26.85 per cent variability in technological gap which was found to be significant \( (F=72.66) \).

It is very much evident from the findings that communication sources are directly related with gap in technologies being adopted by the all selected farmers. It is therefore, very much desired that all the agencies and source of communication become active and efficient so that in further this gap in technology among farmers may be minimised to the possible extent.

6. **Socio-psychological factors as determinant as positive or negative attitude towards adoption of pulse technology**

**Attitude and land holding**

Study reveals that attitude has significant relationship with the size of holding. This significant relation indicates that the size of holding influenced the attitude of the respondents.

**Socio-psychological and attitude towards adoption**

Finding reveals that as far as marginal farmers were concerned,
their attitude towards pulse technology was significantly and positively correlated with socio-economic status and knowledge. However, in case of age and family size has been found to be negative but significant. All the variables taken together explained 62.33 per cent variability in attitude. Only two variable i.e. age and knowledge have made significant contribution towards change in attitude, because both accounted for 61.13 per cent variation in attitude. Contribution other variables towards the attitude of farmers in adoption of pulse technology was almost negligible. While in the case of small farmers has been presented that attitude of respondents towards the pulse technology were significantly and positively correlated with social economic status and knowledge. However in case of age and family size, the relationship has been found to be negative but significant. All the variables taken together explained 26.43 per cent variability in attitude. The contribution of all the seven variables towards change in the attitude were non-significant but age accounted for 17.2 per cent variation in the attitude of adoption. Other variables toward the attitude of adoption for pulse technology was almost negligible.

In the case of other farmers has been presented that attitude of respondents towards the pulse technology were significantly and positively correlated with education, social participation, socio-economic status and knowledge. All the variables taken together explained 32.05 per cent variability in attitude. The contribution of all the seven variables towards change in the attitude were non-significant but socio-economic status accounted for 24.73 per cent variation in the attitude of adoption. Other variables towards the attitude of adoption for pulse technology was almost negligible.
negligible. When all the farmers were taken together it was found that attitude of respondents towards the pulse technology was significantly and positively correlated with caste, education, social participation, socio-economic status and knowledge. However in case of age has been found to be negative but significant. All the seven variables taken together explained 41.97 per cent variability in attitude. Only four variable i.e. age, education, socio-economic status and knowledge have been made significant contribution towards change in attitude, but age, socio-economic status and knowledge accounted for 39.09 per cent variation in attitude contribution. Other variables towards the attitude of farmers in adoption of pulse technology was almost negligible.

7. **Constraints in the adoption of pulse production technology as perceived by the farmers**

To know what types of constraints the farmers faced while adopting the pulse technology an interview schedule was prepared on which their opinion was sought. In the first case they were asked to give general constraints they faced and then in the second case they were asked to mention specific technologies in which they faced specific constraints. So while analysing the data it was found that in general farmers felt three major constraints i.e. lack of guidance by the extension workers about modern technology 55.70%, risk of crop failure 42.45% and poor economic returns 39.10%. However, when it came to specific technologies, they were: plant protection, varieties and fertilizers. The constraints further revealed in the case of each of these three technologies were:
a) Plant protection

In this farmers has given highest rank to "lack of knowledge regarding application of plant protection measures;"

b) Varieties

In this case respondents gave top rank to "lack of guidance by extension workers about modern technology" and

c) Fertilizers

As regards fertilizers, the respondents has given first rank to "poor economic condition of the farmers" as a constraint.

8. Suitable extension strategies to bridge the gap in the adoption of pulse crop technology

8.1 Suggestions to the Government/Institution for improving the pulse production technology

Due to poor adoption of pulse crop technology by the farmers its output has remained almost stagnant for the last three decades. Only recently people have started realising its importance. In the current plan major emphasis has been given to raising pulse production. So to increase the pulse production adoption of the latest technologies among the farmers has to be boosted. For the purpose the present study suggests two main strategies i.e. (1) Area approach and (2) Productivity approach. Provided while following these strategies due to consideration is given to population growth, standard of living and increasing proportion of pulses in the diet along with safe-guard against natural hazards.
While implementing these two strategies all the three wings of the government/institutions engaged in the development of pulses i.e. Research, extension and administration will have to join hands and work in coordination. However, each wing has to carry out its own specific functions to raise the production of the pulses as well as to increase their adoption. To know the most required functions of each wing, opinions of the extension workers were obtained which were as follows:

1) Research

According to the extension functionaries research must give top priority to a) evolving high yielding varieties, b) evolving short duration varieties and c) improving agronomical practices (in that order).

2) Extension

In the functioning of extension agencies, the respondents have given top ranks to a) Demonstration, b) short training for farmers and c) increasing individual contacts.

3) Administration

Similarly while expressing opinion on the priorities to be given by the administration, respondents had suggested follow administrative functions on highest rating. a) to make inputs timely available, b) to supply inputs at subsidised rates and c) to make available quality and certified seeds.

All these functions are inter-related, hence production of the pulses can be boosted only when all the three wings operate with each other.
8.2 Suggestion to the farmers for increasing pulse adoption

For increasing adoption of the pulses among the farmers, suggestions of the extension workers (VDOs) were obtained on the interview schedule which in brief were as follows:

For the purpose the first suggestion extended was the "inclusion of pulses in crop rotation 90% followed by inter and mixed cropping of pulses 80%, controlled irrigation to pulses 75% and growing of short duration crop before the pulses 65%. These suggestion can be implemented if the extension workers themselves motivate the farmers to follow their ideas.

CONCLUSION

From the present study the conclusion that could be drawn are:

1. Majority of respondent were in adult to young age group, they belong to backward to upper castes with low to medium education having joint families and medium to large size with low to medium social participation and medium to low socio-economic status.

2. Except age, rest of all seven variables i.e. caste, education, type of family, size of family, social participation, socio-economic status and level of adoption had their influence on the size of holding.
3. Marginal farmers had assigned highest ranks to the practices such as - interculture 94.7%, irrigation 86.3% and seed rate 90.50%. When the relationship between the adoption level and independent variables was found that only age, caste, family size and knowledge has significant correlation. Age and knowledge explained variation in adoption to the extent of 73.77 per cent.

4. Small farmers had assigned highest ranks to the practices such as: fertilizers 78.3%, interculture 91.6% and irrigation 90%. Adoption of pulse technology was significantly correlated with age, caste, education, social participation and knowledge. Age, caste and knowledge explained variation in adoption to the extent of 76.95 per cent.

5. Other farmers had assigned highest ranks to the practices such as: inter-culture, seed rate and irrigation which were adopted by 91%, 97% and 93% respondent, respectively. Adoption of pulse technology was significantly correlated with age, education, social participation, socio-economic status and knowledge. Social participation and knowledge explained variation in adoption to the extent of 40.10 per cent.

6. When all the farmers were taken together, it had assigned highest ranks to the practices such as: inter-culture 93.00%, irrigation 89% and seed rate 93.00%. Adoption of pulse technology was significantly correlated with age, caste,
education, social-participation, socio-economic status and knowledge. Age, caste, socio-economic status and knowledge explained variation in adoption to the extent of 60.12 per cent.

7. In the case of marginal farmers 52.63% 'medium', 38.95% 'high' and 8.42% 'low' technological gap categories. The mean technological gap score was 39.40. Further, the standard deviation value of the sample was 5.03.

8. Among the small farmers 43.34% 'medium', 35% 'low' and 21.66% 'high' technological gap categories. The mean technological gap score was 34.97. Further standard deviation value of the sample was 6.74.

9. With respect to other farmers, 57.78% medium, 35.56% low and 6.66% high technological gap categories. The mean technological gap score was 33.27. Further the standard deviation value of the sample was 5.54.

10. When all the farmers were taken together, it was found that 51% medium, 26.50% high and 22.50% low technological gap categories. The mean technological gap score was 36.66. Further the standard deviation value of the sample was 6.27.

11. In the case of marginal farmers, other farmers and all selected farmers found that communication sources were negatively and significantly associated with the technological gap. Variability in their technological gap was significant.
12. In case of small farmers communication sources were found to be non-significantly associated with the technological gap. Variability in their technological gap was non-significant.

13. Marginal farmers attitude towards pulse technology was significantly correlated with age, family size, socio-economic status and knowledge. Age and knowledge explained variation in attitude to the extent of 61.13 per cent.

14. While in the case of small farmers correlation between the attitude and independent variables towards pulse technology was significantly correlated with age, family size, socio-economic status and knowledge. Only age explained variation in attitude to the extent of 17.21 per cent.

15. In the case of other farmers, correlation between the attitude and independent variables towards pulse technology was significantly correlated with education, social participation, socio-economic status and knowledge. Only socio-economic status explained variation in attitude to the extent of 24.73 per cent.

16. When all the farmers were taken together, correlation between the attitude and independent variables towards pulse technology was significantly correlated with age, caste, education, social participation, socio-economic status and knowledge. Age, education, socio-economic status and knowledge explained variation in attitude to the extent of 39.09 per cent.
In general constraint farmers felt three major constraints i.e. lack of guidance by the extension worker about modern technology 55.70%, risk of crop failure 42.45% and poor economic return 39.10%. However, when it came to specific technologies they were: a) plant protection: in this, the farmers had given highest rank to "lack of knowledge regarding application of plant protection measure". b) Varieties: in this case respondents gave top ranks to "lack of guidance by extension worker about modern technology" and c) Fertilizers: as regards fertilizers, the respondents had given first rank to "poor economic condition of the farmers", as a constraint.

To increase the pulse production adoption through latest technologies among the farmers has to be boosted. For the purpose the present study suggests two main strategies i.e. 1) Area approach and 2) Productivity approach.

While implementing these two strategies all the three wings of the Government/institution engaged in the development of pulses i.e., Research, Extension and Administration will have to join hands and work in coordination.

For increasing adoption of pulse among the farmers, suggestion of the extension workers were inclusion of pulses in crop rotation 90.00% followed by inter and mixed cropping pulse 80.00% controlled irrigation to pulses 75% and growing of short duration crop before pulses 65%. 
Implication

1. For increasing productivity of pulses, efforts should be made to evolve high-yielding, short-duration, pest and diseases resistant and input responsive pulse varieties.

2. Effective extension approach should be made to bridge the gap in adoption of pulse technology by the farmers. This could be done by making planned and systematic approach to the problems of low production and productivity of pulses, in the form by effective and extensive training programmes, organizing demonstration, making individual contacts, by using and appropriate audio-visual aids. The extension workers can bring about a required changes in production and productivity of pulses provided it receives the Government support and backing in term of timely supply of subsidised inputs in required quantities, remunerative procurement price and marketing facilities. There is no doubt that with our sincere effort at all levels, we can easily achieve the targets of pulse production and productivity.

Suggested areas for further research

Based on the insight gained while conducting the present investigation following areas are suggested for further research on the subject:

1. Adoption pattern of recommended practices in pulses.
2. A study on knowledge of pulse crop technologies and their correlates.

3. Diagnostic survey and appraisal of existing farming system in relation with pulse crop in the state Uttar Pradesh.