Summary and Conclusion
CHAPTER VI

SUMMARY AND CONCLUSION

Field experiments were conducted in a farmer field of Reddiarchatram block of Dindigul District during the late seasons of 1996-97 and 1997-98 to study the effect of organic and inorganic sources of N on growth and yield of sugarcane. The experiments were laid out in split plot design and replicated thrice. The main plot treatments comprised of farm yard manure @ 12.5 t ha\(^{-1}\), FYM @ 6.25 t ha\(^{-1}\) and vermicompost @ 1.5 t ha\(^{-1}\), FYM @ 6.25 t ha\(^{-1}\) and daincha *in situ* incorporation and FYM @ 6.25 t ha\(^{-1}\) and sunnhemp *in situ* incorporation and sub plot treatments includes 100 per cent recommended nitrogen alone, 100, 75 and 50 per cent of recommended N with and without *Azospirillum*.

The observations were made on growth and yield attributes, quality characters, nutrient uptake post harvest analysis and economics of sugarcane. The results obtained in both the years are summarized here under.

The highest germination of 80-83 per cent during 1996-97 and 82-83 per cent during 1997-98 was recorded by different organic and inorganic sources of N.

Among organic sources, application of 100 per cent FYM alone recorded higher number of tillers in both years where as during 1997-98, application of 100 per cent N + *Azospirillum* registered more tillers.
Application of 50 per cent FYM + sunnhemp incorporation recorded higher survival capacity in both the years. With regard to inorganic sources, application of 100 per cent N + *Azospirillum* recorded higher survival capacity in both years.

The taller plant height was recorded in application of 50 per cent FYM + sunnhemp incorporation and application of 100 per cent N + *Azospirillum* than the other treatments in both the years. The maximum DMP was accumulated under 50 per cent FYM + sunnhemp incorporation and application of 100 per cent N + *Azospirillum* in the organic and inorganic sources respectively in both the years at harvest. Application of 50 per cent FYM + sunnhemp *in situ* incorporation registered higher root distribution at all depths whereas application of inorganic did not show significant influence on root distribution.

The growth analysis such as LAI, CGR., RGR and NAR were higher in application of 50 per cent FYM + sunnhemp incorporation (organic sources) and application of 100 per cent N (inorganic sources) + *Azospirillum* than other treatments at 180-270 DAP of both the years.

Millable cane population was maximum at 50 per cent FYM + sunnhemp incorporation, however with respect to inorganic source, application of 100 per cent N + *Azospirillum* recorded more number of millable cane in both the years of study.

The other yield attributes viz., length of millable cane, cane weight, number of internode, length of internode and cane girth were maximum under 50 per cent FYM + sunnhemp incorporation and 100 per cent N + *Azospirillum* in both the years.
In both the years, the highest brix value was noticed under 50 per cent FYM + sunnhemp incorporation and 100 per cent N + *Azospirillum*. The similar trend was also observed in other quality parameters such as sucrose, purity coefficient, commercial cane sugar, juice extraction per cent and reducing sugar per cent.

Application of 50 per cent FYM + sunnhemp incorporation recorded higher cane yield in both the years than the other treatments. With regard to inorganic source, application of 100 per cent N + *Azospirillum* recorded higher cane yield.

The highest sugar yield was registered under 50 per cent FYM + sunnhemp incorporation and application of 100 per cent N + *Azospirillum* in both the years.

The taller plant height of intercrop (daincha) recorded under 100 per cent N + *Azospirillum* application in both years. The biomass was maximum in sunnhemp during both the years.

DMP accumulation was also maximum in sunnhemp under 100 per cent N and *Azospirillum* application in both the years of study.

With regard to plant analysis, the 50 per cent FYM + sunnhemp incorporation recorded higher sheath moisture at all stages of both years of study. Inorganic sources, application of 100 per cent N + *Azospirillum* recorded the highest sheath moisture compared to other treatments.

Sheath N, P and K content were maximum at 50 per cent FYM + sunnhemp incorporation and 100 per cent N + *Azospirillum* in both the years.
Application of 50 per cent FYM + sunnhemp incorporation recorded higher N uptake. With regard to inorganic sources, application of 100 per cent N + *Azospirillum* noticed higher N uptake which was comparable with 75 per cent N + *Azospirillum* in both the years.

The higher ‘P’ and ‘K’ uptake was registered under application of 50 per cent FYM + sunnhemp incorporation and application of 100 per cent N + *Azospirillum* in both the years of study.

The post harvest N availability was maximum under application of 50 per cent FYM + sunnhemp incorporation and it was on par with 50 per cent FYM + daincha incorporation in both years. With regard to, inorganic sources, 75 per cent N + *Azospirillum* exerted higher N availability.

Application of 50 per cent FYM + vermicompost and 50 per cent FYM + sunnhemp incorporation recorded higher post harvest P availability in 1996-97 and 1997-98 respectively where as in both years, application of 100 per cent N + *Azospirillum* recorded higher post harvest P availability.

Similar trend was also observed in post harvest K availability in both the years.

Application of 50 per cent FYM + sunnhemp *in situ* incorporation + 100 per cent N + *Azospirillum* recorded higher gross and net income in both years where as the B:C was maximum at 50 per cent FYM + sunnhemp *in situ* incorporation + 75 per cent N + *Azospirillum* in both the years.
From the above summary, the following conclusions are drawn.

1. Application of FYM @ 6.25 t ha\(^{-1}\) and raising sunnhemp as intercrop and *in situ* incorporation at 45 DAP was found to be effective on increased cane yield and quality characters.

2. Application of 225 kg N ha\(^{-1}\) + *Azospirillum* @ 7.2 kg ha\(^{-1}\) enhanced the cane, sugar yield and quality attributes.

3. Combination of FYM 6.25 t ha\(^{-1}\) + sunnhemp *in situ* incorporation at 45 DAP + 169 kg N ha\(^{-1}\) + *Azospirillum* @ 12 kg ha\(^{-1}\) found to be better on increased cane sugar yield.

4. The higher gross and net income was obtained when applied 6.25 t ha\(^{-1}\) FYM + sunnhemp *in situ* incorporation + 225 kg N ha\(^{-1}\) + *Azospirillum* 7.25 kg ha\(^{-1}\) whereas when applied 169 kg N ha\(^{-1}\) with *Azospirillum* 7.25 kg ha\(^{-1}\) along with 6.25 t ha\(^{-1}\) FYM and sunnhemp incorporation gave higher B:C ratio.

From the study, basal application of FYM @ 6.25 t ha\(^{-1}\) and growing of sunnhemp as intercrop and incorporation on 45 DAP along with 169 kg N and 7.2 kg ha\(^{-1}\) *Azospirillum* are recommended for higher sugarcane yield and sustain the productivity.