Chapter 6

Conclusion
Chapter 6

CONCLUSION

The study entitled “Productivity of baby corn (Zea mays L.) - under different agronomical practices in eastern plateau region” was carried out at Agricultural Experimental Farm of Indian Statistical Institute, Giridih, Jharkhand, India during the years of 2007-08 and 2008-09. Four sets of experiments were undertaken to study the various approaches of integrated nutrient management (INM) on productivity and nutritional quality of baby corn (BC) cultivars, follow up crop(s) (cropping systems) and soil health (physical, chemical and biological indicators of the soil). Another aspect of study was to evaluate the complementarities, weed smothering and weed community structure in BC-legumes intercropping systems. The experimental soils were slightly acidic in reaction, and had low organic carbon (OC), available nitrogen (N) and phosphorus (P) and medium in potassium (K). Soil texture was sandy loam to loam with lower water holding capacity and cation exchange capacity (CEC).

Early composite, baby corn cultivar, produced higher cob and green fodder yield, while VL 16 produced nutritionally superior cobs. Sole inorganic treatment yielded maximum baby corn cob and green fodder. Nutritionally best qualities cobs were obtained when 50 % RD of N was replaced by organic manures. Thirty-percent RD of N substituted through organic manures registered maximum system productivity and economic returns. Application of equal proportions (50:50) of organic and inorganic sources of nutrients improved physical, chemical and biological properties of soil. Nonetheless, soil health deteriorated due to application of 100 % RDF through inorganic sources.

Baby corn and legumes when grown alone produced maximum economic and by-product yield. Baby corn proved itself as a dominant species, whereas legumes were dominated ones. All the intercropping systems produced higher baby corn equivalent yield (BCEY), greater land efficiency, area-time efficiency and monetary advantages
as compared to their respective sole cropping systems, especially where 2:2 row arrangements were maintained. Baby corn + pea system, followed by baby corn + chickpea, particularly in 2:2 row arrangements, seemed to be the best in terms of yield advantages and economics returns. These systems also recorded higher weed diversity and evenness. Intercropping systems possessed lower weed population and biomass over their respective sole cropping system, but these were highest in sole baby corn. Weeding improved crop productivity, land use efficiency and nutrients uptake. Inclusion of legumes and weeding improved soil health.

Application of vermicompost and 150 % RDF (R & W, F₆) recorded significantly higher individual crop(s) productivity as well as system productivity in terms of BCEY. Vermicompost amended plots had higher residual soil fertility and soil biological activities such as microbial load (bacterial and fungus population), microbial activities (basal soil respiration, microbial biomass carbon, microbial quotient and metabolic quotient) and enzyme activities (urease and acid phosphatase). The maximum nutrient uptake (NPK), residual soil fertility (NPK), OC, but minimum biological activities were recorded due to application 150 % RDF (R & W). The cropping systems, BC-BC-BC produced higher BCEY and had superior soil health. Cultivation cost of baby corn, gross returns and net returns were higher for vermicompost application, but B:C ratio was higher when baby corn did not receive vermicompost. The F₃ [150 % RDF (R)] proved itself more remunerative over the others.

Plant growth, yield attributes were recorded maximum at T₁₅ (100 % RDF + AM + Azospirillum). Root length and dry weight were maximum when crop was grown with T₁₆ (150 % RDF + AM + Azospirillum). The highest baby corn cob and green fodder yield were recorded when it was grown with T₁₅. Uptake of nutrients (NPK) by the baby corn was also maximum in T₁₅. Nutrients use efficiency (AUE, AR and PFP) and benefit cost ration were higher when baby corn was grown with 50 % RDF, supplemented with co-inoculants. Soil biological activities (basal soil respiration, microbial biomass carbon, metabolic quotient and microbial quotient) enzyme activities (urease and acid phosphatase) were highest when baby corn received biofertilizers only (T₁₃; absolute control + AM + Azospirillum), followed by T₁₄ (50 % RDF + AM + Azospirillum). Nonetheless, biological activities of soil declined
significantly with the increase in percentages of RDF. Co-inoculated plots built up higher residual soil fertility, enhanced soil organic carbon and had higher soil biological activities. The maximum soil organic carbon and residual soil fertility were recorded in T_{16}.

Based on the above results, it may be recommended that Early composite cultivar of baby corn may be grown with the application of 30 % RD of N through organic manures and remaining through inorganic sources to obtained the higher productivity and good quality cobs, higher system productivity and economic returns as well in a sustainable manner. Baby corn + pea and baby corn + chickpea intercropping systems, particularly in 2:2 row arrangements may be recommended for getting higher system productivity, land use efficiency and monetary advantages. These systems also possessed lower weed population and biomass. Two-weeding improved crop productivity, land use efficiency and soil fertility. Inclusion of legumes improved soil health. Application of vermicompost with 100 % RDF (R & W) may be adopted for getting higher system productivity and economic returns. The BC-BC-BC cropping system may be suggested for producing higher BCEY. T_{15} (100 % RDF + AM + \textit{Azospirillum}) may be recommended for obtaining highest baby corn cob and green fodder yield.

FUTURE PLAN OF WORK
Besides these cultivars some more cultivars can be tested for baby corn with more nutritional quality. There is an urgent need to recycle locally available organic residues more efficiently by using appropriate agronomic technology and management strategy. Biological soil indicators, besides physical and chemical, should be considered for evaluating the soil quality and soil health as these are more sensitive indicators. More biofertilizers, besides AMF and \textit{Azospirillum}, should be evaluated not for the maize but also for other crops. Suitable intercropping combination (cereal-legumes) should be indentified with the aim of biological weed control option.