Chapter 8

SUMMARY AND CONCLUSIONS

A positive attitude causes chain reaction of positive thoughts, events and outcomes. It is a catalyst and it sparks extraordinary results.

-Wade Boggs

Field experiments were conducted on plant and ratoon sugarcane crop with variety co-86032 and co 94012. The main object was to study the comparative effect of different organic manures and fertilizers on growth, quality and yield of sugarcane. During experiment nitrogen was supplied to crop through different organic manures and fertilizers by integrated nutrient management at various levels. There were thirteen different treatments such as 50 % N- CO + 50 % N- u (T_1), 25 % N- CO + 75 % N- U % N- u (T_2), 50 % N- V. C. + 50 % N- U % (T_3) 25 % N- V. C. + 75 % N- U. (T_4) 50 % N- N.C. +50 % N- U (T_5) 25 % N- N. C. + 75 % N- U (T_6) 50 % N- P.M. + 50 % N- U (T_7), 25 % N- P.M. + 75 % N- U (T_8) 50 % N- C. L. 50 % N- U, (T_9) 25 % N- C L + 75 % N- U (T_{10}), M. O. M. (T_{11}), R. D. F. (T_{12}), Control (T_{13}). All these treatments were replicate by three.

During plant and ratoon crop the growth, quality and yield parameter are influence by various treatments which was summarized as follows.

8.1 Growth parameters

8.1.1 Germination % and clump population thousand/ha:

In Plant crop maximum germination percentage was recorded 55.6 % and 57.4 % in sugarcane variety CO86032 and CO94012 respectively, where nitrogen was supplied through 50 % press mud and 50 % urea (T_7). The effect of various treatments on germination percentage can be represented in descending order as follows.

sugarcane variety Co 86032 - 55.63 (T_7), 54.63 (T_3) 51.60(T_9 and T_5), 48.47 (T_11 and T_8), 45.57 (T_4), 45.53 (T_6 and T_{10}) 42.60 (T_{12}), 45.27 (T_{13}), 42.40 (T_2).
sugarcane variety CO 94012 - 57.43 (T7), 54.53 (T3 and 5), 51.50 (T9), 51.47 (T1 and T9), 48.53 (T11 and T3), 45.40 (T6), 45.10 (T10), 42.40 (T7) 42.37 (T13), 42.27 (T12)  

In ratoon crop maximum clump formation was recorded in same treatment with 57.5 thousand ha⁻¹ and 54.5 thousand ha⁻¹ sugarcane variety CO86032 and CO94012 respectively. The effect of various treatments on clump population can be represented in descending order as follows.

sugarcane variety Co 86032 – 57.53(T7& T3) 54.50 (T5), 51.46 (T9 and T1), 48.43 (T4,T8 and T11), 45.46 (T6), 45.40 (T2 and T10), 42.36 (T12 and T13),

sugarcane variety Co 94012 – 54.50 (T7 and T3), 51.50 (T5 and T9), 48.46 (T8), 48.43 (T1), 46.36 (T11), 45.40 (T10), 45.40 (T4), 45.36 (T6), 43.73 (T2), 42.36 (T13), 42.33 (T12).

8.1.2 Number of tillers and shoot population thousand/ha:

In plant and crop maximum increase in number of tillers was recorded 154.2 thousand ha⁻¹ and 151.2 thousand ha⁻¹. Where nitrogen was supplied through 50 % press mud and 50 % urea T7. The effect of various treatments on number of tillers can be represented in descending order as follows.

Sugarcane variety Co 86032–154.23 (T7), 145.27 (T3) 143.30 (T5), 140.30 (T9), 136.30 (T4), 134.30 (T8) 130.27 (T11), 127.23 (T13), 122.23 (T9), 100.33 (T2), 111.27 (T6), 97.20 (T12), 95.30 (T13).

sugarcane variety CO 94012 -151.23 (T7), 142.20 (T3) 140.27 (T9), 140.20 (T5), 135.27 (T1), 131.20 (T9) 130.20 (T11), 126.27 (T8), 120.27 (T10), 110.20 (T4), 99.30 (T2), 96.30 (T12), 93.20 (T13).

In ratoon cane maximum increase in shoot population was 160.3 thousand ha⁻¹ and 155.2 thousand ha⁻¹ respectively in sugarcane variety CO86032 & CO94012. The effect of various treatments on shoot population can be represented in descending order as follows.

sugarcane variety Co 86032–160.30 (T7), 158.23 (T3) 155.26 (T5), 150.23 (T9), 145.23 (T4), 140.20 (T8) 135.30 (T11), 130.30 (T4), 125.23 (T10), 110.30 (T6), 105.23 (T2), 100.30 (T12), 99.30 (T13).
Chapter 8 Summary and conclusions

8.1.3 Total height per plant in cm:

In Plant crop maximum increase in total height of plant was recorded 325 c.m. and 320 c.m. with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % Press mud and 50 % Urea (T₇). The effect of various treatments on Total Height can be represented in descending order as follows.

sugarcane variety Co 86032 - 325 (T₇), 321 (T₃), 319 (T₅), 314 (T₉), 310 (T₁), 303 (T₆) 300 (T₁¹), 297 (T₄), 293 (T₁⁰), 290 (T₂), 285 (T₁²), 280 (T₁₂), 274 (T₁₃).

sugarcane variety CO 94012 -320 (T₇), 318 (T₃), 315 (T₅), 310 (T₉), 307 (T₁¹), 294 (T₄), 290 (T₁), 288 (T₁⁰), 285 (T₆), 283 (T₂), 280 (T₁₂), 270 (T₁₃).

In ratoon crop maximum increase in total height of plant was recorded 310 c.m. and 305 c.m. with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % Press mud and 50 % Urea (T₇). The effect of various treatments on Total height can be represented in descending order as follows.

sugarcane variety Co 86032 - 310 (T₇), 305 (T₃), 304 (T₅), 300 (T₉), 298 (T₁), 296 (T₆) 290 (T₁¹), 288 (T₄), 285 (T₁⁰), 280 (T₆), 274 (T₂), 270 (T₁₂), 265 (T₁₃).

sugarcane variety CO 94012 -305 (T₇), 300 (T₃ and T₅), 296 (T₉), 290 (T₆), 288 (T₁¹), 280 (T₄), 276 (T₁⁰), 272 (T₆), 270 (T₂), 261 (T₁₂), 256 (T₁₃).

8.1.4 Millable height per plant in cm:

In plant crop maximum increase in millable cane height was found 224 cm and 220 cm with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % Press mud and 50 % Urea (T₇). The effect of various treatments on millable height can be represented in descending order as follows.

sugarcane variety Co 86032 - 224 (T₇), 214 (T₃), 210 (T₅), 208(T₉), 206 (T₁), 200(T₈ and T₁¹), 194(T₁⁰), 191 (T₄), 190 (T₆), 184(T₅), 182(T₁₂), 170 (T₁₃).

sugarcane variety CO 94012 -220 (T₇), 211 (T₃), 210 (T₅), 207 (T₉), 205 (T₁) 200 (T₈), 196 (T₁¹), 194 (T₄), 190 (T₁⁰), 186 (T₆), 183 (T₂), 180 (T₁₂), 168 (T₁₃).
In ratoon crop maximum increase in millable cane height was found 212 cm and 210 cm with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % Press mud and 50 % Urea (T7). The effect of various treatments on millable height can be represented in descending order as follows.
sugarcane variety Co 86032 – 212 (T7), 210 (T3) 205 (T5), 201 (T6), 197 (T1), 194 (T8), 190 (T11), 187 (T4), 182 (T10), 181 (T6), 176 (T2), 170 (T12), 163 (T13).
sugarcane variety CO 94012 -210(T7), 205 (T3), 201 (T5), 200 (T9), 194 (T1) 192 (T8), 186 (T11), 182 (T4), 178 (T10), 172 (T6), 165 (T12), 160 (T13).

8.1.5 Girth of plant per cm :

In plant crop maximum increase in girth of cane was 12.50 and 12.40 cm with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % press mud and 50 % urea (T7). The effect of various treatments on girth of plant can be represented in descending order as follows.
sugarcane variety Co 86032 – 12.50 (T7), 12.00 (T3), 11.70 (T5), 11.50 (T9), 11.30 (T1), 11.00 (T8), 10.80 (T11), 10.70 (T4), 10.50 (T10), 10.30 (T6), 10.20 (T2), 10.00 (T12 & T13).
sugarcane variety Co 94012 – 12.40 (T7), 12.20 (T3 & T5), 12.10 (T1), 12.00 (T9), 11.80 (T8), 11.60 (T11), 11.50 (T4), 11.30 (T10), 11.00 (T2 & T6), 10.50 (T12), 10.00 (T13).

In ratoon crop maximum increase in girth of cane was 11.00 and 11.30 cm with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % press mud and 50 % urea (T7). The effect of various treatments on girth of plant can be represented in descending order as follows.
sugarcane variety Co 86032 – 11.00 (T7 & T3), 10.80 (T5), 10.30 (T1), 10.20 (T8), 10.16 (T9), 10.00 (T11), 9.80 (T4), 9.30 (T10), 9.20 (T6), 8.70 (T12), 8.00 (T13).
sugarcane variety Co 94012 – 11.30 (T7), 11.10 (T3), 11.00 (T5), 11.00 (T9), 10.80 (T1), 10.50 (T8), 11.00 (T11), 10.40 (T4), 10.00 (T10), 9.80 (T6), 9.50 (T2), 9.00 (T12), 8.40 (T13).

8.1.5 Number of internodes:

In plant crop maximum increase in number of internodes was 27 and 24 with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % press mud and 50 % urea (T7). The effect of various treatments on girth of plant can be represented in descending order as follows.
sugarcane variety Co 86032 – 11.00 (T7 & T3), 10.80 (T5), 10.30 (T1), 10.20 (T8), 10.16 (T9), 10.00 (T11), 9.80 (T4), 9.30 (T10), 9.20 (T6), 8.70 (T12), 8.00 (T13).
sugarcane variety Co 94012 – 11.30 (T7), 11.10 (T3), 11.00 (T5), 11.00 (T9), 10.80 (T1), 10.50 (T8), 11.00 (T11), 10.40 (T4), 10.00 (T10), 9.80 (T6), 9.50 (T2), 9.00 (T12), 8.40 (T13).
treatments on number of internodes can be represented in descending order as follows.
sugarcane variety Co 86032 – 27(T₇), 26(T³), 25(T₅), 24(T⁹), 23(T¹), 22(T⁸), 21(T₄ and T¹¹), 20(T⁶ and T¹⁰), 19(T²), 18(T¹² and T¹³).
sugarcane variety CO 94012 – 24(T₇), 23(T³ and T⁵), 22(T₁ and T⁹), 21(T⁸) 20(T₄ and T¹¹), 19(T¹⁰), 18(T², T⁶ and T₁²), 17(T¹³).

In ratoon maximum number of internodes was recorded 26 and 24 with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % press mud and 50 % urea (T₇). The effect of various treatments on number of internodes can be represented in descending order as follows.
sugarcane variety Co 86032 – 26(T₇ and T³), 25(T⁵, T₁ and T₉), 24(T⁸), 23(T¹¹), 22(T⁴ and T¹⁰), 21(T⁶), 20(T²), 19(T¹²), 18(T¹³).
sugarcane variety CO 94012 -24(T₇), 23(T³ and T⁵), 22(T⁹ and T₁), 21(T⁸), 20(T¹¹), 19(T¹⁰), 18(T⁶ and T²), 17(T¹²), 16(T¹³).

8.1.6 Length of Internodes per plant in cm:
In Plant crop maximum increase in length of internodes was recorded 18.5 c.m. and 18.0 c.m. in sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50 % press mud and 50 % urea (T₇). The effect of various treatments on length of internodes can be represented in descending order as follows.
sugarcane variety Co 86032 – 18.50 (T₇), 17.50 (T³), 16.50 (T⁵), 16.00 (T⁹), 15.90 (T¹), 15.40 (T⁸), 15.00 (T¹¹), 14.70 (T⁴), 14.50 (T¹⁰), 14.00 (T⁶), 13.70 (T₂), 13.50 (T¹²), 13.30 (T¹₃).
sugarcane variety CO 94012 – 18.00 (T₇), 17.20 (T³), 16.20 (T₃), 16.00 (T⁹) 15.20 (T₁), 15.00 (T⁸ and T¹¹), 14 (T⁴ and T¹₀), 13.90 (T⁶) 13.50 (T₂), 13.00 (T¹₂& T¹₃).

In ratoon crop maximum length of internodes was found 15.7c.m. and 15.0c.m. respectively. Where nitrogen was supplied through 50 % press mud and 50 % urea (T₇). The effect of various treatments on length of internodes can be represented in descending order as follows.
Sugarcane variety Co 86032 – 15.70 (T7), 15.50 (T3), 15.20 (T5), 15.00 (T1 & T9), 14.70 (T8), 14.50 (T11), 14.10 (T4), 14.00 (T10), 13.50 (T6), 13.00 (T2), 12.80 (T12), 12.50 (T13).

Sugarcane variety CO 94012 – 15 (T7 & T3), 14.90 (T5), 14.50 (T9), 14.00 (T8 & T11), 13.50 (T4), 13.20 (T10), 13.00 (T6), 12.80 (T2), 12.70 (T12), 12.20 (T13).

8.2 Juice Quality:

8.2.1. Brix Percentage:

In Plant cane maximum brix percentage was recorded 25.49 % & 28.08 % with sugarcane variety CO86032 &CO94012 respectively. Where nitrogen was supplied through 50 % press mud & 50 % urea. The effect of various treatments on brix percentage can be represented in descending order as follows.

sugarcane variety Co 86032 – 25.49 (T7), 25.09 (T3), 27.74 (T5), 24.55 (T0), 24.49 (T1), 24.29 (T9), 24.15 (T11), 23.97 (T4), 23.89 (T5), 23.80 (T10), 23.34 (T12), 23.33 (T5), 21.91 (T13).

sugarcane variety CO 94012 – 28.00 (T7), 27.87 (T3), 27.60 (T5), 27.46 (T0) 27.10 (T1), 26.90 (T8), 26.68 (T11) 26.47 (T4) 26.32 (T10), 26.21 (T6) 25.89 (T2), 25.68 (T12) 25.50 (T13).

In ratoon cane maximum brix percentage was recorded 25.2 % in sugarcane variety CO86032 where nitrogen was supplied 50 % vermicompost + 50 % urea (T3). Where as in variety CO94012 maximum brix was recorded 27.39 % where nitrogen was supplied 50 % Neemcake & 50 % urea. The effect of various treatments on brix percentage can be represented in descending order as follows.

sugarcane variety Co 86032 – 25.21 (T3), 25.11 (T12) 25.00 (T1), 24.88 (T5), 24.73 (T8), 24.70 (T5), 24.53 (T7), 24.47 (T4), 24.33 (T9), 24.24 (T10), 24.16 (T11), 24.07 (T2), 23.90 (T13).

sugarcane variety CO 94012 – 27.39 (T5), 27.36 (T3), 27.35 (T6), 27.14 (T1) 27.03 (T9), 26.79 (T7), 26.74 (T2) 26.66 (T10) 26.27 (T4), 26.24 (T8) 25.12 (T11), 24.70 (T12) 24.33 (T13).

8.2.2 Sucrose percentage:

In Plant crop maximum increase sucrose percentage was 20.27 and 23.90 with sugarcane variety CO86032 and CO94012 respectively where nitrogen was
supplied through 50% Press mud and 50% urea. The effect of various treatments on sucrose percentage can be represented in ascending order as follows.

**sugarcane variety Co 86032** – 20.27 (T7), 19.80 (T3), 19.29 (T9), 19.14 (T1), 19.10 (T8), 19.04 (T11), 19.84 (T4), 18.49 (T10), 18.43 (T6), 18.16 (T2), 17.74 (T12), 16.47 (T13).

**sugarcane variety CO 94012** – 23.90 (T7), 23.37 (T3), 23.16 (T5), 22.88 (T9), 22.74 (T1), 22.66 (T8), 22.57 (T11), 22.28 (T4), 21.87 (T10), 21.57 (T6), 20.56 (T2), 20.41 (T12), 19.79 (T13).

In ratoon crop maximum sucrose percentage was 20.14 and 22.79 with sugarcane variety CO86032 and CO94012 respectively. Where nitrogen was supplied through 50% Press mud and 50% Urea (T7). The effect of various treatments on sucrose percentage can be represented in descending order as follows.

**sugarcane variety Co 86032** – 20.14 (T6), 20.00 (T3), 19.98 (T1), 19.86 (T4 and T12), 19.84 (T9), 19.77 (T5), 19.48 (T2), 19.47 (T7), 19.45 (T11), 19.30 (T8), 19.28 (T13), 19.13 (T10).

**sugarcane variety CO 94012** – 22.79 (T6), 22.68 (T11), 22.67 (T7), 22.51 (T10), 22.29 (T3), 21.77 (T5), 21.64 (T4), 21.61 (T9), 21.26 (T2), 21.23 (T6), 21.01 (T11), 20.34 (T12), 19.35 (T13).

### 8.2.3 Purity Percentage:

In plant crop maximum increase in purity percentage was recorded 79.55 and 85.11 percent with sugarcane variety CO86032 & CO94012 respectively. Where nitrogen was supplied through 50% Press mud + 50% Urea (T7). The effect of various treatments on purity percentage can be represented in descending order as follows.

**Sugarcane variety Co 86032** – 79.55 (T7), 78.82 (T11), 79.29 (T4), 78.91 (T3), 78.58 (T9), 78.54 (T8), 78.17 (T1), 77.85 (T5), 77.67 (T10), 77.22 (T5), 76.88 (T6), 76.01 (T12), 75.18 (T13).

**Sugarcane variety CO 94012** – 85.11 (T7), 84.60 (T11), 84.23 (T3), 84.17 (T4), 83.92 (T5 and T1), 83.88 (T3), 83.31 (T9), 83.07 (T10), 82.27 (T6), 79.49 (T12), 79.41 (T2), 77.61 (T13).

In ratoon crop in case of sugarcane variety CO86032 maximum increase in purity percentage was recorded 81.52 percent where nitrogen was supplied through 50% cassia leaves + 50% urea (T9). For sugarcane variety CO94012

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maximum purity percentage was found 84.64 percentages where nitrogen was supplied through 50 % press mud + 50 % urea (T_7). The effect of various treatments on purity percentage can be represented in descending order as follows.

Sugarcane variety Co 86032 – 81.52 (T_9), 81.15 (T_4) 80.99 (T_6), 80.97 (T_2), 80.74 (T_3), 80.51 (T_11), 80.00 (T_5), 79.85 (T_1), 79.36 (T_7), 79.31 (T_3), 79.06 (T_12), 78.92 (T_10), 77.99 (T_8).

Sugarcane variety CO 94012 – 84.64 (T_7), 84.48 (T_10), 83.61 (T_10), 83.59 (T_1), 83.30 (T_6), 82.38 (T_4), 82.33 (T_13), 81.47 (T_3), 80.93 (T_8), 79.92 (T_9), 79.62 (T_13), 79.52 (T_2), 79.48 (T_3).

8.2.4 Commercial cane Sugar Percent

In plant crop maximum increase in C.C.S. Percentage was found 13.46 % with sugarcane variety CO 86032 where nitrogen was supplied 50 % through pressmud + 50 % urea (T_6). Whereas in CO 94012 highest C.C.S. percentage was recorded 16.45 % where nitrogen was supplied through 50 % pressmud + 50 % urea (T_7). The effect of various treatments on commercial cane sugar percent can be represented in descending order as follows.

Sugarcane variety Co 86032 – 13.46 (T_7), 13.09 (T_3) 12.72 (T_9), 12.58 (T_1 and T_8), 12.57 (T_11), 12.55 (T_4), 12.47 (T_5), 12.11 (T_10), 12.00 (T_6), 11.91 (T_2), 11.47 (T_12), 10.58 (T_13).

Sugarcane variety CO 94012 – 16.45 (T_7), 15.97 (T_3), 15.83 (T_3), 15.58 (T_9) 15.54 (T_1), 15.51 (T_5), 15.49 (T_11), 15.25 (T_4), 14.86 (T_10), 14.59 (T_6), 13.64 (T_2), 13.54 (T_12), 12.96 (T_13).

In ratoon crop in CO 86032 maximum C.C.S. percentage was 13.51 % where nitrogen was supplied through 25 % neem cake + 75 % urea (T_6). In CO 94012 it was found 15.56 % where nitrogen was supplied 50 % pressmud + 50 % urea (T_7). The effect of various treatments on commercial cane sugar percent can be represented in descending order as follows.

Sugarcane variety Co 86032 – 13.51 (T_7), 13.35 (T_9) 13.33 (T_4), 13.29 (T_1), 13.26 (T_3), 13.17 (T_5), 13.14 (T_12), 13.06 (T_2), 13.00 (T_11), 12.91 (T_7), 12.90 (T_13), 12.67 (T_8), 12.64 (T_10).

Sugarcane variety CO 94012 – 15.56 (T_7), 15.51 (T_6), 15.47 (T_1), 15.42 (T_10) 14.99 (T_3), 14.64 (T_4), 14.45 (T_5), 14.39 (T_9), 14.33 (T_11), 14.22 (T_8), 14.11 (T_2), 13.76 (T_12), 12.85 (T_13).
8.2.5 Commercial cane Sugar MTha⁻¹

In plant crop maximum increase in C.C.S. MTha⁻¹ was found 19.05 MTha⁻¹ with sugarcane variety CO 86032. Where nitrogen was supplied through 50 % vermicompost + 50 % urea (T₃). Whereas in CO 94012 highest C.C.S. MTha⁻¹ was recorded 22.75 MTha⁻¹ where nitrogen was supplied through 50 % pressmud + 50 % urea (T₇). The effect of various treatments on commercial cane sugar MTha⁻¹ can be represented in descending order as follows. sugarcane variety Co 86032 – 19.05 (T₇), 17.82 (T₃), 16.41 (T₅), 16.16 (T₉), 15.50 (T₁), 14.50 (T₈), 13.86 (T¹¹), 13.31 (T₄), 12.40 (T¹⁰), 10.88 (T₆), 10.44 (T₂), 9.68 (T¹²), 8.06 (T¹³).

sugarcane variety CO 94012 – 22.75 (T₇), 21.39 (T₃), 20.60 (T₃), 19.41 (T₉) 18.41 (T₁), 17.72 (T₈), 16.78 (T¹¹), 16.13 (T₄), 14.93 (T₁₀), 12.92 (T₆), 11.72 (T₂), 10.91 (T₁₂), 09.52 (T₁₃).

In ratoon crop in Co 86032 maximum C.C.S. MTha⁻¹ was 13.11 MTha⁻¹ where nitrogen was supplied through 50 % vermicompost + 50 % urea (T₃) whereas in CO 94012 highest C.C.S. was recorded 14.80 MTha⁻¹ where nitrogen was supplied 50 % pressmud + 50 % urea (T₇). The effect of various treatments on commercial cane sugar MTha⁻¹ can be represented in descending order as follows.

Sugarcane variety Co 86032 – 13.11 (T₃), 12.94 (T₇) 12.64 (T₉), 12.53 (T₅), 12.41 (T₁), 11.99 (T₆), 11.98 (T₄), 11.81 (T¹¹), 11.52 (T² and T₈), 11.51 (T¹²), 11.23 (T₁₀), 11.08 (T¹³).

Sugarcane variety CO 94012 – 14.80 (T₇), 13.59 (T₃), 13.48 (T₁), 12.83 (T₅) 12.57 (T₉), 11.96 (T¹⁰), 11.94 (T₆), 11.64 (T₈), 11.59 (T₁₁), 11.37 (T₄), 10.85 (T₂), 10.52 (T₁₂), 09.75 (T₁₃).

8.3 Total Yield of plant MTha⁻¹

The maximum increase in total yield for Plant crop was recorded 167.4tha⁻¹ and 170.8 tha⁻¹ respectively for sugarcane variety CO86032 and CO94012. The effect of various treatments on total plant yield MTha⁻¹ can be represented in descending order as follows.
Sugarcane variety Co 86032 – 167.40 (T7), 161.70 (T3), 156.90 (T5), 152.11 (T9), 148.16 (T1), 139.30 (T8), 133.95 (T11), 128.97 (T4), 125.30 (T10), 113.43 (T6), 109.05 (T2), 106.48 (T12), 96.85 (T13).
Sugarcane variety CO 94012 – 170.80 (T7), 166.10 (T3), 162.20 (T5), 156.40 (T9), 149.68 (T1), 145.27 (T8), 139.35 (T11), 136.17 (T4), 130.24 (T10), 117.53 (T6), 115.10 (T2), 109.43 (T12), 102.50 (T13).

In ratoon cane maximum total yield was 125.9 tha\(^{-1}\) and 121.5 tha\(^{-1}\) respectively. In both season maximum total yield was observed in treatments where nitrogen was supplied through 50 % Press mud and 50 % Urea (T7). The effect of various treatments on total plant yield MTha\(^{-1}\) can be represented in descending order as follows.

Sugarcane variety Co 86032 – 125.96 (T7), 124.32 (T3), 120.54 (T5), 119.95 (T9), 118.57 (T1), 115.60 (T8), 115.02 (T11), 113.70 (T4), 112.32 (T10), 112.09 (T6), 111.34 (T2), 110.43 (T12), 108.03 (T13).
Sugarcane variety CO 94012 – 121.58 (T7), 117.09 (T3), 115.24 (T5), 113.74 (T9), 118.47 (T1), 108.10 (T8), 107.06 (T11), 103.83 (T4), 103.60 (T10), 103.00 (T6), 102.65 (T2), 101.84 (T12), 100.83 (T13).

8.4 Dry Matter kg/ha:

In plant crop the total dry matter kg/ha found 66120.82 and 69865.55 kg/ha\(^{-1}\) in sugarcane variety CO 86032 and CO 94012 respectively. Where nitrogen was supplied through 50 % Press mud + 50 % Urea (T7). The effect of various treatments on dry matter kg/ha\(^{-1}\) can be represented in descending order as follows.

Sugarcane variety Co 86032 – 66120.82 (T7), 63438.47 (T3), 61684.40 (T5), 59482.03 (T9), 58042.91 (T1), 54428.84 (T8), 51508.59 (T11), 50599.92 (T4), 48084.20 (T10), 43710.91 (T6), 42063.40 (T2), 40641.18 (T12), 36781.22 (T13).
Sugarcane variety CO 94012 – 69865.55 (T7), 67281.76 (T3), 65667.71 (T5), 62097.83 (T9), 59001.57 (T1), 56832.73 (T8), 54291.23 (T11), 52833.49 (T4), 49056.61 (T10), 44874.48 (T6), 43630.47 (T2), 41053.64 (T12), 37299.95 (T13).

In ratoon crop the total dry matter kg/ha was found 59097.62 and 59188.19 kg/ha\(^{-1}\) in sugarcane variety CO 86032 and CO 94012 respectively where nitrogen was supplied through 50 % press mud + 50 % urea(T7). The effect of various treatments on dry matter kg/ha\(^{-1}\) can be represented in descending order as follows.
Sugarcane variety Co 86032 – 59097.62 (T7), 58195.54 (T3), 56336.60 (T5), 55528.11 (T9), 54567.78 (T1), 52867.13 (T8), 52284.63 (T11), 51399.28 (T4), 50560.95 (T10), 50054.50 (T6), 49508.40 (T2), 48907.27 (T12), 47490.20 (T13).

Sugarcane variety CO 94012 – 59188.19 (T7), 56571.87 (T3), 55429.66 (T5), 5443.71 (T9), 54035.41 (T1), 51502.86 (T3), 51094.73 (T8), 48564.82 (T4), 48210.09 (T10), 47484.93 (T6), 47037.43 (T2), 46483.87 (T12), 45859.89 (T13).

8.5 Nutrient Uptake kg/ha:

In plant crop when crop receiving nitrogen through 50 % press mud and 50 % urea exhibited maximum total nutrient (N+P+K) uptake of 386.23, 108.52, 325.26 kg/ha respectively in sugarcane variety CO86032 and 348.24, 109.96, 313.80 kg/ha respectively in sugarcane variety CO94012.

In ratoon season when crop receiving nitrogen through 50 % press mud and 50 % urea exhibited maximum total nutrient (N+P+K) uptake of 369.54, 99.67 and 300.39 kg/ha respectively in sugarcane variety CO86032 and 352.38, 91.61, 299.57 kg/ha respectively in sugarcane variety CO94012.

From above discussion it was summarized that when we have supplied nitrogen through integrated nutrient management. All treatments showed positive effect on various growth parameters such as germination percentage, tillering count, clump and shoot population, total and millable height, girth, length and number of internodes. The dry mater kg/ha, nitrogen, phosphorous and potassium content and uptake in cane, green top and total plant was also influenced by integrated nutrient management. The positive increase was also found in yield of cane and juice quality parameters viz brix percentage, sucrose percentage, purity percentage, commercial cane sugar percentage and C. C. S. MTha. The effect of various treatments also affect on net profit and benefit cost ratio.

When all 13 treatments were compared for growth, yield and quality parameters the sequence among them stands in the descending order as T7 – I, T3 – II, T5 – III, T9 – 4, T1 – 5, T8 – 6 T11-7, T4-8, T10-9, T6-10, T2-11, T12-12, T13-13.

T7 proved as the best nutrient source and stands first among all the treatments. The treatment is 50 % N- pressmud + 50 % N- Urea (T7). Pressmud is the by Product of the sugar factory treated as the waste. If it
is utilized as a nutrient source it gives the best results, otherwise it creates a nuisance and environmental pollution along with the bad smell around factory showing its existence and presence of the factory. It spreads for a long distance diffusing the smell. If it is utilized as a nutrient source for sugarcane crop it will reduce the nuisance, clean the environment. The Reuse and Recycling of this waste will reduce the production cost and input for the crop with boosting its production and quality and stands 1st among all the treatments for its results.

- $T_7$ is followed by $T_3$ stands at the second position showing productivity and quality and the nutrient source is 50 % N - vermicompost +50 % N-Urea. Urea is common for both the treatments but the miracle invertibrate earth worm which produce the casting i.e. the waste released by their intestine works with high efficiency boosting the production and quality of the sugarcane crop. The friend of the farmers converts the waste in to wealth and good quality food nutrient for the growing crop releasing the nutrients slowly as per the requirement of the crop and protecting the natural resources as air, water and soil. We should be thankful to the nature, its cycle and worms which feeds voraciously on the waste and releases the costly nutrients for the crop reducing the input and production cost of the crop.

- $T_3$ followed by $T_5$ the treatment is 50 % N- neem cake + 50 % N- Urea. Here again Urea is common factor and neem cake, the by product of neem oil production. The residue remained after extraction of neem oil, the total plant having bitter taste and which is concentrated in the kernals i.e. in the seeds. Neem cake as the organic supplements releases the nutrients slowly increasing the production and quality of the crop and easily available in the vicinity of the field. The miracle of the the nature as sow the bitter in the soil and harvest the sweets which again reduces 50 % production cost in place of the chemical fertilizers.

- $T_5$ followed by $T_9$ the treatment is 50 % N- cassia leaves + 50 %N- Urea. Cassia is a weed with high nitrogen content among the weed plants represents the family legeuminosae having the root nodules which
contains nitrogen bacteria and has the capacity to convert the environmental nitrogen into the nitrates and nitrites in the usable form for the plants with the help of the symbiotic bacteria. These tiny microscopic bacteria has the capacity to convert the environmental nitrogen which is about 80% of the sphere and leaving the residual nutrients for the following crop. Which is available free of cost thus again reducing the 50% production cost and input for the crop.

- \( T_9 \) followed by \( T_1 \) which is 50% N- compost + 50% N- Urea. Again Urea is common factor and the compost is the product of agricultural waste worked by the fungi and bacteria, which are natural decomposers which reduce the bulk and increase the nutrients in the usable form for the crop again protecting the natural resources as air, water and soil thus reducing the production cost and input for the crop.

- \( T_9 \) followed by \( T_8 \) i.e. 25% N- pressmud + 75% N- Urea. The earlier research had showed that if input of chemical fertilizers is increased above 50% or more than that it will reduce the production and quality of the crop. Therefore 50% contribution plays the best as in \( T_7 \). This treatment shows that 50:50 is the best and not 25:75 combination of organic and inorganic supplement for the production and quality of the crop.

- \( T_8 \) followed by \( T_{11} \) and the treatment is the only mixed organic manures and not the inorganic or chemical fertilizers. Organic manures release the nitrogen and other nutrients slowly as per the requirement but it is not sufficient to increase the growth and quality and stands at the 6th position but here the nutrients are not supplied through chemicals or inorganic fertilizers. Still only organic sources also increased the production and reducing the input for the productivity.

- \( T_{11} \) followed by \( T_4 \) and the treatment is 25% N- vermicompost + 75% N- Urea. When we increase the quantity of chemical or inorganic fertilizers it reduce the production and quality of the crop increasing the input cost and reducing the growth and quality of the crop. More chemical
fertilizers means less growth and quality and increase in the input cost of the crop. Therefore it has to be controlled and should be limited at the 50 % input only where 50:50 proved the best.

- \(T_4\) followed \(T_{10}\) i.e. 25 % N- cassia leaves + 75 % N- Urea. This combination is unable to give the sufficient nutrition to the crop and the balance is disturbed. More dose of chemical fertilizers and 25 % i.e. less inorganic will not satisfy the nutrient need of the crop plant reducing the production and quality of the crop increasing inorganic fertilizer at the 75 % will increase the input cost reducing all the growth and quality parameters on the negative scale.

- \(T_{10}\) followed by \(T_6\) and the treatment is 25 % N- neem cake + 75 % N- Urea. Here again 75 % Urea is common which reduces the production and quality of the crop. 25 % nitrogen through neem cake is not the sufficient source as nutrient and urea more than 50 % is not digestible for the crop and can not absorbed and utilized by the crop plant gives the negative effect on production and quality. Urea is very good source of nitrogen for the crop but should be limited to only 50 %. If it is increased to 75 % it is the waste and increase the input coast reducing the production and quality of the crop.

- \(T_6\) followed by \(T_2\) and the treatment is 25 % N- compost + 75 % N- Urea. The results show that when we supplied 25 % nitrogen through compost is not sufficient to increase the production and quality it has to be increased up to 50 % and over dose of urea is not consumed and utilized by the crop. Thus the imbalance in nutrient supply again increases the input cost and thus reduces the production showing the importance of organic food for the crop plants less organic manures means more starvation of the crop plants.

- The treatment \(T_2\) followed by \(T_{12}\) is the Recommended dose of fertilizer in the from of NPK. It stands at the lowest level of production for quantity and quality of crop increasing the production cost. Only inorganic fertilizers will not work in competition with the organic fertilizer. Organic
fertilizer when used alone as in T
11
it occupies 7th position in the sequence. While only inorganic fertilizer occupied the 12th position which is the lowest one among the treatments and only just above and very near to the control.

- Control falls last it is expected also. None of the organic manures or inorganic fertilizers are not supplied in this treatment. This forms as the basic yard stick to compare the capacity of all treatments. When we arrange the nutrient response given by crop in the sequential manner.

Conclusions :

- Crop plant require both organic and inorganic fertilizers in combination as 50 : 50 for better growth, yield and quality.

- When we arrange on the priority basis pressmud stands first, followed by vermicompost2 followed by neem cake3, then cassia leaves4 and then compost5.

- As per the availability of the nutrient source farmers can choose the type of organic material reducing the input cost with the wise combination of organic and inorganic fertilizers.

- Only organic or only inorganic will not work. If we have to choose among them choose only organics.

- All the organic fertilizers are available at the low cost. as compost, vermicompost can be prepared by the farmers on the farm and neem cake can be purchased from the market. Pressmud is available as waste product from sugar industry. All these organic manures are having lower cost as compared to the chemical fertilizer.

- 50 % N- Pressmud. + 50 % N- Urea (T7) stands as the best treatment followed by 50 % N- Vermicompost + 50 % N- Urea (T3), followed by 50 % N- Neem cake + 50 % N- Urea (T5) followed by 50 % N- Cassia Leaves + 50 % N- Urea (T9) followed by 50 % N- Compost + 50 % N-Urea (T1).
The same sequence was followed by both varieties along with their ratoons also. When the nutrient source of organic fertilizers is reduced to 25% it reduces the production with increase in the cost and reduction of the quality and quantity of the crops.

This gives us the warning that do not go in addiction of organic or inorganic fertilizers but have a balance as 50:50 for highest production and best quality of the crop decreasing the input cost of the crop.

This research work had given an alternative for 50% N-through organic fertilizers but the requirement of chemical fertilizer is never zero but it should be 50%.

The judicial combination of organic and inorganic and inorganic fertilizer proved to be the best for increasing growth and quality parameters among the crop reducing the production cost or input of the crop.

When the balance between input and output is disturbed, it increases the pressure on the farmers and they are unable to bear. This pressure resulting the suicidal incidents of the farmers.

Through this research let us give the massage to the farmers that use the fertilizers in combination and as per the digesting capacity of the crops.

It means that research had given the way to struggle with the crisis successfully coming out of it.

Research had given the way but many times we are unable to get in touch with it.

To commit the suicide is not the solution but the judicial input, protecting natural resources with successful output using correct technology will boost the national production and economy of the farmers along with the national income and reducing the dipendance of the people on the resources from abroad.
• Let us strengthen the economy of the farmers and national income protecting our natural resources as air, water and soil along with our health and health of the cattle.

• Integrated use of organic and inorganic fertilizers is extremely important for sustaining the production of plant and ratoon sugarcane crop.

• Organic agriculture will enhance the ability of farmers to live in harmony with nature and to drive economic benefit from their land with the conservation of natural resources.

• Application of organic manures and fertilizers by integrated manner is helpful to increase juice quality parameters such as brix %, Sucrose %, C.C.S. %, and that ultimately helpful for increasing the sugar recovery. The sugar recovery is important factor for sugar production and hence it will be more beneficial to sugar industries.

• When we apply chemical fertilizer alone continuously the deterioration of soil take place and soil becomes non fertile. From different research workers it is found that combine application of organic manures and fertilizer is helpful to increase the soil fertility.

• Sugarcane is long duration crop it required large amount of nutrients for longer period when we Supply organic manures along with fertilizers the organic manures was slow release and hence it may be available for longer period to sugarcane crop.

• Experimentally it is found that combine application of organic manures and inorganic fertilizer influence the nutrient up take from soil. Absorbed nutrients is ultimately utilize for various physiological process that is helpful to increase the growth and yield of sugarcane crop.

• Considering the highest cane yield per hectare and net economic benefit it has been suggested that integrated application of 50 % organic and 50 % inorganic fertilizer is more beneficial than 25 % organic manures and 25 % in organic fertilizer to farmer. Among the various treatments 50 % N-pressmud + 50 %N- Urea (T7) shows more net profit.
In short we can say that sugarcane crop responded positively to different organic manures with integrated use along with fertilizer. It not only gave better effect in growth, quality and yield but improve economic output. A strategy involving the integrated application of these manures with inorganic fertilizer will not only sustain our soil but will also be beneficial for our farmers in terms of cost saving and sustainability. Organic agriculture systems enhance the ability of farmers to live in harmony with nature and to derive economic benefit from their land while simultaneously conserving and improving the natural environment.