**B) To study the influence of various important nutrient interactions on sunflower and safflower seed yield.**

**Sunflower in Alfisols**

Higher sunflower hybrid (DRSH-1) seed yield (882.5 kg/ha) was recorded in Ca30B3 however, it was at par with Ca30B2 treatment. Application of calcium at 30 kg/ha and boron at 2 kg/ha resulted in high sunflower seed yield in Ca and B deficient red sandy loam soils.

Sunflower hybrid (DRSH-1) seed yield varied significantly between the two years due to the seasonal, environmental and soil factors. Nitrogen, phosphorus and sulphur uptake by seed showed significant variation in both the years.

Seed yield was significantly influenced by various levels of nitrogen application (as main plot treatment) Similar trend was observed with respect to phosphorus application under sub plot treatment. In case of sulphur application seed yield showed significant variation.

In general, nitrogen, P and S uptake by seed showed significant variation under different levels of N application. Similar trend was observed in different levels of P application (sub plot treatment) too. Nitrogen and phosphorus uptake by seed under various levels of S application as sub plot treatment showed statistically significant variation. S uptake by seed however was found at par under 15 and 30 kg S/ha and highest was observed in 45 kg S/ha.

*N x P interaction*

Interaction effects between N x P was found statistically significant in seed yield. N, P and S uptake by seed showed significant interaction of N and P.

*N x S interaction*

N x S interaction was found non-significant with respect to the seed yield. Uptake of N, P and S by seed was also found non-significant.

*P x S interaction*

Interaction effects between P x S was found statistically significant in seed yield. P uptake by seed showed significant interaction of P and S.

*N x P x S interaction*

N x P x S interaction was found non-significant with respect to the seed yield. Uptake of N, P and S by seed was also found non-significant.

***Application of fertiliser dose @ N90P80S45 recorded highest sunflower seed yield in Alfisol while lowest was recorded in control.***

**Sunflower in Vertisols**

Sunflower hybrid, DRSH-1 seed yield varied significantly between the two years due to the seasonal, environmental and soil factors. Nitrogen, phosphorus and sulphur uptake by seed showed significant variation in both the years.

Seed yield was significantly influenced by various levels of nitrogen application (as main plot treatment). Similar trend was observed with respect to phosphorus application under sub plot treatment. In case of sulphur application seed yield showed significant variation.

Nitrogen, P and S uptake by seed showed significant variation under different levels of N application. Similar trend was observed in different levels of P and S application (sub plot treatments) too.

Nitrogen and phosphorus uptake by seed under various levels of S application as sub plot treatment showed statistically significant variation.

*N x P interaction*

Interaction effects between N x P was found statistically significant in seed yield. However N, P and S uptake by seed showed significant interaction of N and P.

*N x S interaction*

N x S interaction was found non-significant with respect to the seed yield. In general uptake of N, P and S by seed was also found non-significant. Interaction of N and S known to be synergistic.

*P x S interaction*

Interaction effects between P x S was found statistically significant in seed yield. N, P and S uptake by seed showed significant interaction.

*N x P x S interaction*

N x P x S interaction was found non-significant with respect to the seed yield. Uptake of N, P and S by seed was also found non-significant.

***Application of fertilizer dose @ N90P80S45 recorded highest sunflower seed yield in Vertisol while lowest was recorded in control. Further, the seed yield was relatively higher in Vertisol than in Alfisol.***

**Safflower in Vertisol**

Safflower variety PBNS-12 was grown during the *rabi* seasons of 2011, 12 and 13 in the Vertisols of ICRISAT-DOR farm as per the technical programme. Achievements of these experiments are presented below year-wise.

***Rabi* 2011**

Safflower seed yield was significantly influenced by the various levels of N and S application. Interaction effect of N x S was also found statistically significant.

Uptake of N, P and K by safflower seed was significantly influenced by the various levels of N and S application. Interaction effect of N x S was also found statistically significant. Whereas. uptake of S by safflower seed at harvest was effected significantly due to the application of various levels of N and interaction effects of N x S were also found significant.

***Rabi* 2012**

Uptake of N and S by safflower (cv. PBNS-12) seed was significantly influenced by the various levels of N and S application. Their interaction effect was also found significant.

***Rabi* 2013**

Safflower (cv. PBNS-12) seed yield was significantly influenced by the various doses of N and S applied. Their interaction effects of N x S were also found significant. Test weight was significantly influenced by the various doses of N and S applied. Their interaction effects were also found significant.

***The highest mean safflower (cv. PBNS-12) seed yield (3080 kg/ha) was recorded in N80S45 treatment and lowest in control (1372 kg/ha). Nitrogen and sulphur levels individually and their interaction effect was found significant with respect to dry matter yield and seed yield. Post-harvest soil samples revealed that no significant variation among the treatments in mean organic carbon content, available nitrogen and phosphorus. Available nitrogen and phosphorus contents was low in control plots while available sulphur content has shown a partial build-up.***