The Pharma Innovation Journal 2023; 12(3): 1740-1744

www.ThePharmaJournal.com

The Pharma Innovation

**ISSN (E): 2277-7695**
**ISSN (P): 2349-8242**
**NAAS Rating: 5.23**
TPI 2023; 12(3): 1740-1744

www.thepharmajournal.com
Received: 18-01-2023
Accepted: 21-02-2023

**Kiran Emmiganur**
Part of Ph.D. (Agri.) Thesis submitted to University of Agricultural Sciences, Dharwad, Karnataka, India

**PS Matiwade**
Principal Scientist (AINRP on Tobacco) Agricultural Research Station, Dharwad, Karnataka, India

**SA Gaddanakeri**
Professor of Agronomy, Chief Scientist Agricultural Research Station, Dharwad, Karnataka, India

**Corresponding Author:**
**Kiran Emmiganur**
Part of Ph.D. (Agri.) Thesis submitted to University of Agricultural Sciences, Dharwad, Karnataka, India

# Economical analysis of organic weed management in sweet corn through smother crops and green leaf manures

**Kiran Emmiganur, PS Matiwade and SA Gaddanakeri**

**Abstract**
In the present-day context, organic sweet corn assuming greater importance due to its chemical free nature and has a big market potential. Weed menace is one of the major challenges under organic production system. Therefore, a field experiment was conducted at All India Network Programme on Organic Farming (NPOF) unit at University of Agricultural Sciences, Dharwad on *Vertisols* with medium soil fertility during *kharif* 2020 and 2021 to find out suitable economical intercropping followed by in situ mulching and green leaf manure (GLM) for weed management in sweet corn under organic production system. The experiment was laid out in Randomized Complete Block Design with three replications. The treatment comprises of four intercrops *viz*., cowpea, green gram, sun hemp and sesbania with 1:1 proportion and were mulched at 35 DAS and three GLM *viz*., *Gliricidia sepium*, *Pongamia pinnata* and *Cassia* sericea @ 5 t $ha^{-1}$ were mulched at 18 DAS and Inter cultivation at 20 and 40 DAS followed by one hand weeding at 20 DAS, Weedy check, Weed free check. The results of the experiment indicated that intercropping with cowpea (1:1) and mulching at 35 DAS recorded significantly higher fresh cob yield (169 q $ha^{-1}$) and fresh fodder yield (343 q $ha^{-1}$) as compared to other treatments. However, these results were on par with intercropping with green gram (1:1) and mulched at 35 DAS. Among all the different smother/intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) recorded higher gross returns and net returns per hectare (Rs. 3,05,237 and Rs. 2,31,315 $ha^{-1}$ $ha^{-1}$, respectively). B:C ratio (4.13) recorded significantly higher with intercropping with cowpea (1:1) and mulching at 35 DAS.

**Keywords:** Mulching, organic weed management, net returns and sweet corn

## Introduction
Maize (*Zea mays* L.) is one of the most important cereal crops grown all over the world as food and also as cattle and poultry feed. Maize belongs to Poaceae family and has an important position in crop husbandry because of its higher yield potential and short duration. Due to its high yielding nature among the cereal crops, it is popularly known as "Queen of cereals". It can be grown under various environmental conditions. Maize grain contains about 72% starch, 10% protein, 4.8% oil, 9.5% fiber, 3% sugar, and 1.7% ash.

The maize is classified into seven groups based on the characters of grain. *viz.*, dent corn, flint corn, sweet corn, flour or soft corn, pop corn, baby corn and waxy corn. Among which, sweet corn (*Zea mays* L. var. *saccharata* Sturt) is mainly grown in USA and Canada. It is also known as sugar corn, it is a hybridized variety of maize (*Zea mays* L.) specifically bred to increase the sugar content. Grains possess a considerable amount of sugar. It differs from dent type only by one recessive gene which prevents the conversion of sugar into starch. After maturity, grains become wrinkled. The cobs are picked up green for canning and table purpose. Sweet corn is the same botanical species as a common corn; the main difference is that the endosperm in the grains of fresh sweet corn has greater polysaccharide content. Sweet corn (*Zea mays* L. var. *Saccharata* Sturt) was introduced to India from USA. The fruit of the sweet corn plant is the corn grain. It has a sugary rather than a starchy endosperm and a creamy texture.

Sweet corn is gaining popularity in urban areas of India because of its higher sugar (11-20%), low starch content and delicious nature. People living in urban areas prefer roasted sweet corn cobs as they are very tasty and nutritious. Roasted green cobs provide starch, fat, protein, sugar, minerals and vitamins in palatable and digestible form at relatively low cost. Sweet corn is gaining importance in the star hotels and urban areas for preparation of special soups, sweets, jams, cream, pastes and other delicious eatables.

It is also grown as a vegetable to be eaten fresh and in some parts of the world it is used to produce syrup. Besides, its fodder is highly succulent, palatable and digestible. In India, sweet corn is cultivated on very small area by some farmers and private sectors to meet the demands of many industries. The net income from sweet corn is higher as compared to grain maize.

Generally Maize is not responding to organic farming as its nutrients requirement is quite high. In the initial years of conversion 30-40% yield reduction was common in Maize, but in sweet corn, yield reduction can be well compensated by higher price and urban people prefer organically produced sweet corn.

Among different biotic factors which have a significant influence on the performance of sweet corn, weeds are the most important one. Weeds are unwanted plants playing a very significant role in different agro-eco-system and many of them cause direct and indirect losses. Weeds cause huge reduction in crop yield but also increase cost of cultivation and reduce input use. Maize plant is vigorous and tall in nature and it is very sensitive to weed competition at early stages of growth. Yield losses in maize crop due to weeds are estimated up to 35 per cent. Understanding the ecological relationship in crop – weed competition, it is significantly important to develop an effective crop management technology and to prevent the huge loss due to weeds.

Weeding has traditionally been a labour-intensive operation in crop production. Different weed control practices like chemical, cultural, physical and biological are used to control the weeds. Herbicidal weed management has become a key component in almost all weed management strategies. At the same time, the continuous use of the same group of herbicides over a period of time on a same piece of land leads to ecological imbalance in terms of weed shift, herbicide resistance in weeds and environmental pollutions. (Gnanavel and Natarajan, 2014) [5].

Herbicide application may also sometime affect beneficial microorganisms and indirectly helps in disease causing organisms to become a problem (Kalia and Gupta, 2004) [9]. Continuous use of herbicides for longer period may sometimes leads to serious ecological problems. Organic way of cultivation is suitable to overcome these problems and to reduce the residual effect of agrochemicals. Some of the organic methods of weed management are mechanical weeding, growing of cover crop, crop rotation with legume and non- legume crops, modifying the sowing and planting techniques, changing sowing and planting time, mulching with organic residues, green manuring and the adoption of reduced or zero tillage, soil solarization, hand weeding, spray of phyto extracts and intercropping makes an inappropriate environment for weed seed germination and their growth which results in better yield. Reduction in weed competition, higher fresh cob yield and low input result in high net returns.

## Material and methods

a field experiment was conducted at All India Network Programme on Organic Farming (NPOF) unit at University of Agricultural Sciences, Dharwad on *Vertisols* with medium soil fertility during *kharif* 2020 and 2021 to find out suitable intercropping followed by in situ mulching and green leaf manure (GLM) for weed management in sweet corn under organic production system. The experiment was laid out in Randomized Complete Block Design with three replications. The treatment comprises of four intercrops *viz*., cowpea, green gram, sun hemp and sesbania with 1:1 proportion and were mulched at 35 DAS and three GLM *viz*., *Gliricidia sepium*, *Pongamia pinnata* and *Cassia* sericea @ 5 t $ha^{-1}$ were mulched at 18 DAS and Inter cultivation at 20 and 40 DAS followed by one hand weeding at 20 DAS, Weedy check, Weed free check. 9.2 tonnes of FYM and 4.40 tonnes of vermicompost applied to field to supply nutrient requirements. Data on fresh cob yield and fresh fodder were recorded at harvest.

### Costs of cultivation

In computing the economics, different variable cost items were considered. The cost included expenditure on seeds, organic manures, bio pesticides and labour charges at prevailing market prices during 2020 and 2021. Labour requirement was worked out on the basis of laborers engaged for performing different field operations. Also to work out the economics of sweet corn cultivation.

### Gross returns

The gross returns per hectare was calculated by considering the prices of sweet corn cob and green fodder yield prevailing at the time of marketing and expressed in rupees per hectare (₹ $ha^{-1}$)

Gross returns = Total value of the produce (both fresh cob and fresh fodder).

### Net returns

The net returns per hectare was calculated by deducting the cost of cultivation from the gross returns on hectare basis and expressed in rupees per hectare (₹ $ha^{-1}$)

Net returns = Gross returns - Cost of cultivation.

### Benefit cost ratio

The benefit cost ratio was worked out by dividing gross returns by total cost of cultivation.

$$B:C = \frac{\text{Gross returns (₹ ha}^{-1})}{\text{Cost of cultivation (₹ ha}^{-1})}$$

### Transformation of data

Data on weed count and weed dry weight have shown high degree of variation. A relationship between the means and variance was observed. Therefore, the data on weed count and weed dry weight were subjected to square root of (x + 0.5) transformation to make analysis of variance more valid as suggested by Bartlett (1947) [12].

### Statistical analysis and interpretation of data

The experimental data obtained were subjected to statistical analysis by adopting Fisher's method of analysis of variance as outlined by Gomez and Gomez (1984) [6]. The level of significance used in 'F' test was at 5 per cent. The mean value subjected to Duncan's multiple range test (DMRT) using the corresponding mean sum of square and degree of freedom values.

## Results and Discussion (pooled data)

### Effect on fresh cob yield and fodder yield

The weed free check ($T_{10}$) recorded significantly higher fresh cob yield (207 q $ha^{-1}$) followed by inter-cultivation at 20 and

40 DAS and one hand weeding at 20 DAS ($T_8$) (181 q $ha^{-1}$) compared to other treatments. Among all the different intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) recorded significantly higher fresh cob yield (169 q $ha^{-1}$) and it was on par with $T_8$. Among the different green leaf manure treatments, higher fresh cob yield (145 q $ha^{-1}$) was noticed in mulching with *Gliricidia sepium* @ 5 t $ha^{-1}$ ($T_5$). Whereas, significantly lower fresh cob yield (113 q $ha^{-1}$) was recorded in weedy check ($T_9$).

The weed free check ($T_{10}$) recorded significantly higher fresh fodder yield (393 q $ha^{-1}$) followed by inter-cultivation at 20 and 40 DAS and one hand weeding at 20 DAS ($T_8$) (359 q $ha^{-1}$). Among all the different intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) recorded significantly higher fresh fodder yield (343 q $ha^{-1}$). However, it was on par with $T_8$ and $T_2$. Among the different green leaf manure treatments, higher fresh fodder yield (298 q $ha^{-1}$) was noticed in mulching with *Gliricidia sepium* @ 5 t $ha^{-1}$ ($T_5$) followed by mulching with *Cassia sericea* @ 5 t $ha^{-1}$($T_7$) (295 q $ha^{-1}$) and lower in mulching with *Pongamia pinnata* @ 5 t $ha^{-1}$ ($T_6$) (290 q $ha^{-1}$). Whereas, significantly lower fresh fodder yield (239 q $ha^{-1}$) was recorded in weedy check ($T_9$). The improvement in fresh cob yield and fresh fodder yield could be attributed to better translocation of metabolites for cob development. It was due to reduced weed competition in these treatments. These results are in conformity with the findings of Sharma and Gautam (2006) [11].

**Gross returns**

The data on gross returns per hectare of sweet corn as influenced by different smother/intercrops and green leaf manures for weed management under organic production during the individual years as well as pooled data are presented in Table 1.

The weed free check ($T_{10}$) recorded significantly higher gross returns per hectare (₹ 3,71,242 $ha^{-1}$) followed by inter-cultivation at 20 and 40 DAS and one hand weeding at 20 DAS ($T_8$) (₹ 3,25,033 $ha^{-1}$). Among all the different smother/intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) recorded higher gross returns per hectare (₹ 3,05,237 $ha^{-1}$). However, it was on par with other intercropping treatments. Among the different green leaf manure treatments, higher gross returns per hectare (₹ 2,62,153 $ha^{-1}$) was noticed in mulching with *Gliricidia sepium* @ 5 t $ha^{-1}$ ($T_5$) followed by mulching with *Cassia sericea* @ 5 t $ha^{-1}$ ($T_7$) (₹ 2,60,354 $ha^{-1}$) and lower in mulching with *Pongamia pinnata* @ 5 t $ha^{-1}$ ($T_6$) (₹ 2,55,724 $ha^{-1}$). Whereas, significantly lower gross returns per hectare (₹ 2,05,247 $ha^{-1}$) was recorded in weedy check ($T_9$). Similar trend was observed during both the years.

**Net returns**

The data on net returns per hectare of sweet corn as influenced by different smother/intercrops and green leaf manures for weed management under organic production during the individual years as well as pooled data are presented in Table 1.

The weed free check recorded significantly higher net returns per hectare (₹ 2,66,856 $ha^{-1}$) followed by inter-cultivation at 20 and 40 DAS and one hand weeding at 20 DAS ($T_8$) (₹ 2,47,503 $ha^{-1}$) However, it was on par with $T_1$. Among all the different smother/intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) recorded higher net returns per hectare (₹ 2,31,315 $ha^{-1}$). However, it was on par with other intercropping treatments except $T_3$. Among the different green leaf manure treatments, higher net returns per hectare (₹ 1,86,069 $ha^{-1}$) was noticed in mulching with *Gliricidia sepium* @ 5 t $ha^{-1}$ ($T_5$) followed by mulching with *Cassia sericea* @ 5 t $ha^{-1}$ ($T_7$) (₹ 1,84,270 $ha^{-1}$) and lower in mulching with *Pongamia pinnata* @ 5 t $ha^{-1}$ ($T_6$) (₹ 1,79,640 $ha^{-1}$). Whereas, significantly the lowest net returns per hectare (₹ 1,33,933 $ha^{-1}$) was recorded in weedy check ($T_9$). Similar trend was observed during both the years.

**B:C ratio**

The data on B:C ratio of sweet corn as influenced by different smother/intercrops and green leaf manures for weed management under organic production during the individual years as well as pooled data are presented in Table 1.

The inter-cultivation at 20 and 40 DAS and one hand weeding at 20 DAS ($T_8$) recorded significantly higher B:C ratio (4.19) compared to other treatments except $T_1$ and $T_2$. Among all the different smother/intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) recorded significantly higher B:C ratio (4.13). Among the different green leaf manure treatments, higher B:C ratio (3.45) was noticed in mulching with *Gliricidia sepium* @ 5 t $ha^{-1}$ ($T_5$) followed by mulching with *Cassia sericea* @ 5 t $ha^{-1}$ ($T_7$) (3.42) and lower in mulching with *Pongamia pinnata* @ 5 t $ha^{-1}$ ($T_6$) (3.36). Whereas, significantly the lowest B:C ratio (2.88) was recorded in weedy check ($T_9$). Similar trend was observed during both the years.

Higher net returns and B: C ratio were recorded in inter-cultivation at 20 and 40 DAS followed by one hand weeding (₹ 2,47,503 $ha^{-1}$ net returns and 4.19 B:C ratio). Among all the different smother/intercrops (mulching) and green leaf manure treatments, intercropping with cowpea (1:1) and mulching at 35 DAS ($T_1$) (₹ 2,31,315 $ha^{-1}$ net returns and 4.13 BC ratio) recorded higher net returns and B : C ratio when compared to other treatments and on par with the $T_8$ treatment. This is because of higher economic yield, net return and lower cost of cultivation. The increase in benefit under these treatments might be due to enhancement in green cob and forage production leading to increased monetary return with comparatively acceptable cost of cultivation. These findings are in close vicinity with the views of Hawaldar and Agasimani (2012) [8], Arvadiya *et al.* (2012) [1].

**Table 1:** Economics of sweet corn as influenced by different smother/intercrops (mulching) and green leaf manures for weed management in sweet corn under organic production

| Treatments | Fresh cob yield (q ha$^{-1}$) | | | Gross returns (₹ ha$^{-1}$) | | | Net returns (₹ ha$^{-1}$) | | | B:C ratio | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2020 | 2021 | Pooled | 2020 | 2021 | Pooled | 2020 | 2021 | Pooled | 2020 | 2021 | Pooled |
| $T_1$ - Intercropping with cowpea (1:1) and mulching at 35 DAS | 176.23$^{bc}$ | 162.34$^{bc}$ | 169.29$^{bc}$ | 317492$^{bc}$ | 292781$^{bc}$ | 305137$^{bc}$ | 243504$^{abc}$ | 219125$^{bc}$ | 231315$^{bc}$ | 4.29$^{a}$ | 3.97$^{a}$ | 4.13$^{ab}$ |
| $T_2$ - Intercropping with greengram (1:1) and mulching at 35 DAS | 169.85$^{bcd}$ | 157.04$^{bcd}$ | 163.45$^{cd}$ | 306605$^{bcd}$ | 283670$^{bcd}$ | 295138$^{cd}$ | 232692$^{bcd}$ | 210089$^{bcd}$ | 221391$^{cd}$ | 4.15$^{a}$ | 3.86$^{ab}$ | 4.00$^{abc}$ |
| $T_3$ - Intercropping with sunhemp (1:1) and mulching at 35 DAS | 161.12$^{cde}$ | 148.34$^{cde}$ | 154.73$^{def}$ | 290713$^{cde}$ | 268239$^{cde}$ | 279476$^{def}$ | 216650$^{cde}$ | 194508$^{cde}$ | 205579$^{de}$ | 3.93$^{ab}$ | 3.64$^{a-d}$ | 3.78$^{cd}$ |
| $T_4$ - Intercropping with sesbania (1:1) and mulching at 35 DAS | 163.25$^{cde}$ | 150.42$^{cde}$ | 156.84$^{de}$ | 294951$^{cde}$ | 272137$^{cde}$ | 283544$^{cde}$ | 221001$^{bcde}$ | 198519$^{cde}$ | 209760$^{cd}$ | 3.99$^{ab}$ | 3.7$^{abc}$ | 3.84$^{bcd}$ |
| $T_5$ - Mulching with *Gliricidia sepium* @ 5 t ha$^{-1}$ | 151.23$^{de}$ | 139.25$^{de}$ | 145.24$^{efg}$ | 272493$^{de}$ | 251812$^{de}$ | 262153$^{efg}$ | 196243$^{de}$ | 175894$^{de}$ | 186069$^{ef}$ | 3.57$^{b}$ | 3.32$^{cd}$ | 3.45$^{e}$ |
| $T_6$ - Mulching with *Pongamia pinnata* @ 5 t ha$^{-1}$ | 147.45$^{e}$ | 135.91$^{e}$ | 141.68$^{g}$ | 265756$^{e}$ | 245692$^{e}$ | 255724$^{g}$ | 189506$^{e}$ | 169774$^{e}$ | 179640$^{f}$ | 3.49$^{b}$ | 3.24$^{d}$ | 3.36$^{e}$ |
| $T_7$ - Mulching with *Cassia sericea* @ 5 t ha$^{-1}$ | 150.26$^{de}$ | 138.26$^{de}$ | 144.26$^{fg}$ | 270528$^{de}$ | 250179$^{de}$ | 260354$^{fg}$ | 194278$^{de}$ | 174261$^{e}$ | 184270$^{ef}$ | 3.55$^{b}$ | 3.30$^{cd}$ | 3.42$^{e}$ |
| $T_8$ - Inter-cultivation at 20 and 40 DAS and one hand weeding at 20 DAS. | 187.85$^{b}$ | 173.60$^{b}$ | 180.73$^{b}$ | 337734$^{b}$ | 312332$^{b}$ | 325033$^{b}$ | 260038$^{ab}$ | 234968$^{ab}$ | 247503$^{ab}$ | 4.35$^{a}$ | 4.04$^{a}$ | 4.19$^{a}$ |
| $T_9$ - Weedy check | 117.74$^{f}$ | 109.00$^{f}$ | 113.37$^{h}$ | 212305$^{f}$ | 198189$^{f}$ | 205247$^{h}$ | 140825$^{f}$ | 127041$^{f}$ | 133933$^{g}$ | 2.97$^{c}$ | 2.79$^{e}$ | 2.88$^{f}$ |
| $T_{10}$ - Weed free check | 213.32$^{a}$ | 201.55$^{a}$ | 207.44$^{a}$ | 381308$^{a}$ | 361176$^{a}$ | 371242$^{a}$ | 275484$^{a}$ | 258228$^{a}$ | 266856$^{a}$ | 3.60$^{b}$ | 3.51$^{bcd}$ | 3.56$^{de}$ |
| S.Em. ± | 6.39 | 5.60 | 3.66 | 11507 | 10104 | 6592 | 11507 | 10104 | 6592 | 0.14 | 0.13 | 0.09 |

**Note:** Means followed by the same alphabet (s) within a column are not significantly differed by DMRT (P = 0.05)

## Conclusion

Among different intercrops (mulching) and green leaf manures treatments, intercropping with cowpea (1:1) and mulching at 35 DAS recorded significantly higher fresh cob yield and higher fresh fodder yield with significantly higher economical returns.

## References


1. Arvadiya LK, Raj VC, Patel TU, Arvadiya MK. Influence of plant population and weed management on weed flora and productivity of sweet corn (*Zea mays*). Indian Journal of Agronomy. 2012;57(2):162-167.
2. Bhuvaneswari J. Weed management in organically grown maize-sunflower cropping system, Tamilnadu Agricultural University Coimbatore-641 003, 2005.
3. Choudhary CK, Singh RN, Upadhyay PK, Singh, RK, Vijay P. Effect of vegetable intercrops and panting pattern of maize on growth, yield and economics of winter maize (*Zea mays* L.) in Eastern Uttar Pradesh. Environment Ecology. 2014;32(1):101-105.
4. Das A, Kumar M, Ramkrushna GI, Patel DP, Layek J, Naropongla AS, *et al*. Weed management in maize under rainfed organic farming system. Indian Journal of Weed Science. 2016;48(2):168-172.
5. Gnanavel I, Natarajan SK. Eco-friendly weed control option for sustainable agriculture: A Review. Agricultural Review. 2014;35:172-183.
6. Gomez KA, Gomez AA. Statistical procedures agricultural research, (2/e) an international rice research institute book, A Willey Inter Science publication, John Willey and Sons, New York, 1984.
7. Hargilas. Integrated weed management in maize (*Zea mays* L.) for sustainable productivity and profitability of maize-wheat cropping system in Southern Rajasthan. International Journal of Bio-Resource and Stress Management. 2016;7(3):382-387.
8. Hawaldar S, Agasimani CA. Effect of herbicides on weed control and productivity of maize (*Zea mays* L.). Karnataka Jounnal of Agricultural Science. 2012;25(1):137-139.
9. Kalia A, Gupta RP. Disruption of food web by pesticides. Indian Journal Ecology. 2004;31:85-92.
10. Meena H. Integrated weed management in maize (*Zea mays* L.) for sustainable productivity and profitability of maize-wheat cropping system in southern rajasthan. International Journal of Bio-resource and Stress Management. 2016;7(3):382-387.
11. Sharma CK, Gautam RC. Effect of tillage, seed rate and weed control methods on weeds and maize. Indian Journal of Weed Science. 2006;38(1/2):55- 61.

12. Bartlett MS. The use of transformations. Biometrics. 1947 Mar 1;3(1):39-52.

**Appendix I:** Prices of input and output (2020 and 2021)

| Sl. No. | Particulars | Unit | Price (₹) |
|---|---|---|---|
| **A) Inputs** | | | |
| 1 | Land preparation | | |
| | Tractor cultivation | hr | 1,500 |
| | Harrowing (bullock pair) | day | 1,200 |
| 2 | Seeds | | |
| | Sweet corn | kg | 2500 |
| | Cowpea | kg | 60 |
| | Greengram | kg | 70 |
| | Sunhemp | kg | 45 |
| | Sesbania | kg | 45 |
| 3 | Manures | | |
| | FYM | t | 1500 |
| | Vermicompost | t | 3000 |
| | *Azospririllum* | kg | 80 |
| | Phosphate solubilizing Bacteria (PSB) | kg | 80 |
| | Panchagavya | l | 250 |
| 4 | Plant protection | | |
| | *Psedomonas* | kg | 250 |
| | *Nomuraea rileyi* | kg | 250 |
| | Neam oil | l | 400 |
| | Cow urine | l | 5 |
| 5 | Labour Wages | | |
| | Men | day | 318 |
| | Women | day | 318 |
| **B) Outputs** | | | |
| 1 | Fresh cob yield | q | 1600 |
| 2 | Fresh fodder yield | q | 100 |