

**Novel Organic Crop System Management Practices to Increase Return of Farmers in India****Mr. Sagar Narayan Dakhane<sup>1\*</sup>**

<sup>1</sup>Assistant Professor,  
MES Abasaheb Garware College,  
Pune-04 Affiliated to Savitribai Phule Pune  
University Pune  
Maharashtra, India., Email:sagarsnd@gmail.com

**Dr. Amrut Gunwantrao Gaddamwar<sup>1</sup>**

<sup>1</sup>Assistant Professor,  
Amolkachand Mahavidyalaya Yavatmal,  
Affiliated to Sant Gadge Baba Amravati University  
Amravati,  
Maharashtra, India,

**Dr. Tukaram P.Chavan<sup>2</sup>**

<sup>2</sup>Associate Professor, Amolkachand Mahavidyalaya Yavatmal,  
Affiliated to Sant Gadge Baba Amravati University Amravati,  
Maharashtra, India,

\* Corresponding author: [sagarsnd@gmail.com](mailto:sagarsnd@gmail.com) (mobile : 7498566382)

**Abstract**

*The first use of synthetic Pesticide & Chemical fertilizer was reported in 1930, 1940 respectively. Every year more than 2.26 million tons of pesticide & 5307 million tons of fertilizer consumed in India, India is the 2<sup>nd</sup> largest consumer of urea in the world. Due to excessive use of Fertilizers paste attach to a crop is increase & ultimately pesticide consumption is increasing and increases the expenditure. According to NCRBI-2012 one Lakh, 35,585 Farmers committed suicide in India, 3786 are from Maharashtra. Every year three million cases of pesticide poisoning occur worldwide. 99% of death is due to pesticide poisoning are from a developing country. Motivation: to stop the economic crisis of the farmers by reducing expenditure, To provide an alternative to chemical fertilizers and pesticides, To increase the yield organically at low cost, To increase the fertility of the soil by retaining useful bacteria of the soil.*

**KEYWORDS:** Organic, multiple crop pattern, creeper crop, natural architectures, crop selection.

**1. Introduction**

**T**raditionally farmer cultivates fixed types of crops alternately in India, in a particular region. In India day by day, excessive use of fertilizers, pesticides, fungicides, herbicides, and chemical micronutrients is increased <sup>[1]</sup>. Due to this expenditure of farmers increase but the yield of the crop is not increasing in the same proportion. Excessive use of fertilizers, pesticides, fungicides, herbicides, and chemical micronutrient affects the natural quality of the soil and decreases the fertility of the soil <sup>[2-4]</sup>. Due to increases in the expenditure of overall cultivation cost and decreases in net profit, farmer's comet suicides in India, According to different reports in 2010, 2011, and 2012 1,34,599, 1,35,445 and 1,35,585 farmers comet suicides respectively <sup>[5]</sup>. In India different parts of different crops are cultivated as per rainfall pattern, climatic conditions, in an agronomical year farmers, cultivate

at least three to four crops <sup>[6]</sup>. By the proper selection crop as per the climatic condition of the region, it is possible to increase the overall yield of the farmer, to cross verify the above concept we select 3-acre land at shahapur village, Dhamangaon Taluka, Amravati district, Maharashtra state, India <sup>[7-8]</sup>.

Four different crops are selected one is pigeon pea having BSMR-736 variety, other crops were Bitter Gourd, Quora, and Cucumber which are creeper crops, pigeon pea crop sowed in the rainy session i.e. in June and it is harvested at a height of 4.5 feet from the bottom in the month of January, after harvesting pigeon pea crop a natural architecture of pigeon pea crop remains in the field, which is used as a natural support for the creeper crops such as Bitter Gourd, Quora, and Cucumber <sup>[9-11]</sup>. These crops are sowed in February 0.5 feet away from the root of pigeon pea crop, due irrigation and organic fertilizer supply, within 45 to 55 days again we get the yield of Bitter Gourd, Quora, Cucumber and green pigeon pea pods.

**2. Materials And Methods:**

**2.1 CROP SELECTION:** According to climatic condition and soil structure, weather, the following four crops are selected for the cultivation, out of which pigeon pea crop in ruby (rainy) season, other three i.e. Bitter Gourd, Quora, and Cucumber which are creeper for ruby season

**2.2 SOWING OF PIGEON PEA:** pigeon pea seeds of Variety-BSMR-736 Selected and sowed in June after the proper standard seed treatment to avoid wilt, root rust, i.e. in ruby season, as per planning of standard crop management practices [12].

**2.3 ORGANIC TREATMENT OF PIGEON PEA CROP:** After sowing of the above-mentioned seeds, it is treated with five liters of crude cottonseed oil along with a half-liter Emulsifier which is used as emulsifier based on potassium after 20, 50, 80 days interval through drenching respectively.

Each spray consist of a crude cottonseed oil 250ml + crude Soybean oil 250 ml + crude flaxseed oil 250 ml + crude groundnut oil + 100 ml Emulsifier foliar spray on a pigeon pea crop, After 110, 120, 140 days interval.

**2.4 HARVESTING OF PIGEON PEA CROP:** In January pigeon pea crop is harvested at the height of 4 to 4.5 feet above from the root by leaving the other architecture as it is which is utilized as a natural climber for the creeper crops i.e. Bitter Gourd, Quora, and Cucumber.

**2.5 SELECTION OF CREEPER CROP:** In India, November to February is a winter season, this season is suitable for the Bitter Gourd, Quora, and Cucumber creeper crop therefore these crops are selected for the cultivation in Kharif season [13-14].

**2.6 SOWING OF CREEPER CROPS:** Sowing of Bitter Gourd, Quora, and Cucumber seeds, after its seed treatment, half feet away from the pigeon pea plant root, this remaining natural architecture are used as a climber for this creeper crops.

**2.7 ORGANIC TREATMENT OF CREEPER CROPS:** To each creeper crop After sowing 10, 20 days interval 5-liter crude cottonseed oil+ 500ml Emulsifier is supplied during the watering of the crop, similarly Each spray consist of a crude cottonseed oil 250ml + crude Soybean oil 250 ml + crude flaxseed oil 250 ml + crude groundnut oil + 100 ml Emulsifier foliar spray on a creeper crop, After 10, 15, 20 days interval. Due to the supplement

of above organic fertilizers as well as spray pigeon pea crop also gets the same and flowering and pods formation takes place to pigeon pea crop also second time, which is pick up, it is off-season of pigeon pea pods, sold at a high rate.

**2.8 APPLICATION OF PIGEON PEA CROP FOR CREEPER CROP:**

The here main objective of keeping of pigeon pea crop architecture is to save expenditure, time of farmer. This natural architecture of pigeon pea crop is not only natural architecture for the creeper crops but also the production of green pods of pigeon pe the offseason.

Sr.No	Year	FARMER SUICIDES
1	2010	1,34,599
2	2011	1,35,445
3	2012	1,35,585

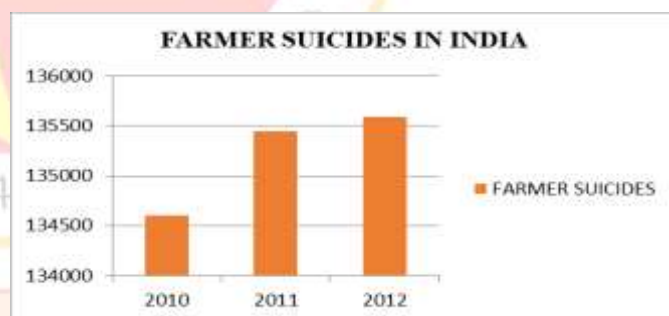


Figure 1. Shows farmer suicide rate in India

**Table 1. Shows Treatment of pigeon pea using Organic crude oils**

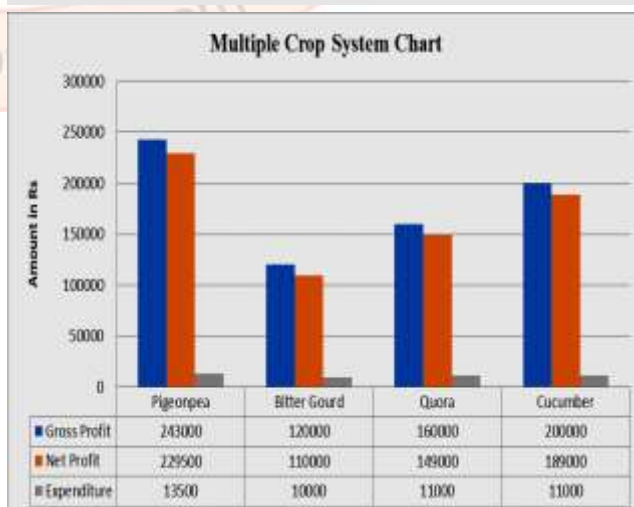
Particular	Treated plot	Cost/Expenditure
<b>Variety-BSMR-736</b>	6 kg/ Acre	Rs=1500/-
<b>Date of sowing</b>	3-June-2018	
<b>Distance between row</b>	6 feet	
<b>First Dose Crude cotton seed oil after 20 days</b>	5 liters/Acre Through drip	Rs=250+100=350/-
<b>Second Dose Crude cotton seed oil 50 days</b>	5 liters/Acre Through drip	Rs=250+100=350/-
<b>Third Dose Crude cotton seed oil After 80 Days</b>	5 liters/Acre Through drip	Rs=250+100=350/-
<b>After 100 days First Dose of Crude cotton seed oil 250ml + Crude Soybean oil 250 ml + Crude flax seed oil 250 ml + Crude Groundnut oil + 100 ml Emulsifier</b>	1 liter oil with 100 ml Emulsifier mixed with 200 liter water and Foliar spray on pigeon pea crop	Rs=200/-
<b>First dose After 110 days First Dose of Crude Neem oil 250ml + Crude Soybean oil 250 ml + Crude flax seed oil 250 ml + Crude Groundnut oil + 100 ml Emulsifier</b>	1 liter oil with 100 ml Emulsifier mixed with 200 liter water and Foliar spray on pigeon pea crop	Rs=100/-
<b>Second dose After 120 days First Dose of Coconut oil 250ml + Crude Soybean oil 250 ml + Crude flax seed oil 250 ml + Crude Groundnut oil + 100 ml Emulsifier</b>	1 liter oil with 100 ml Emulsifier mixed with 200 liter water and Foliar spray on pigeon pea crop	Rs=100/-
<b>Third dose After 140 days First Dose of Sunflower oil 250ml + Crude Soybean oil 250 ml + Crude flax seed oil 250 ml + Crude Groundnut oil + 100 ml Emulsifier</b>	1 liter oil with 100 ml Emulsifier mixed with 200 liter water and Foliar spray on pigeon pea crop	Rs=100/-
<b>Labor cost</b>	Weed control/Spraying of oil	Rs=10000/-
<b>Total Yield of Pigeon pea crop (Dry +wet)</b>	15 Quintal/ Acre	Total Expenditure
<b>Total Amount/Acre</b>	Rs=81000/-	Rs=13500/-
<b>Net Profit/ 3 Acre</b>	Rs[81000x3 = Rs2,43,000-13500/-]=Rs=229500/-/ 3 Acre Excluding Expenses'	
<b>Total Profit in 3 acre</b>	Rs=229500/-	

**Table 2. Shows Treatment of Bitter Gourd, Quora and Cucumber using Organic crude oils**

Particular	Treatment Detail	Total Cost/Expenditure	Expenditure Detail
<b>Bitter Gourd-Japan mala</b>	After sowing 10 days 5 liter crude cotton seed oil+ 500ml Emulsifier given & after 20 days interval	Rs=10000/-	[Seed-Rs=1000/-; Oil (10 lit.) Rs=750+Labour Rs=8250/-]
<b>Yield</b>	30 quintal	30X4000=Rs=1,20,000/-	
<b>Net Profit</b>	[Rs=1,20,000/-] - [Total Expenditure Rs=8250/-]= Rs=111750/-		
<b>Total Profit</b>	Rs=111750/- Excluding expenditure		
<b>Quora Myco-102</b>	After sowing 10 days 5 liter crude cotton seed oil+ 500ml Emulsifier given & after 20 days interval	Rs=11000/-	[Seed-Rs=1500/-; Oil (10 lit.) Rs=750+Labour Rs=8750/-]
<b>Yield</b>	40 quintal	40X4000=Rs=1,60,000/-	
<b>Net Profit</b>	[Rs=1,60,000/-] - [Total Expenditure Rs=8750/-]= Rs=1,51,250/-		
<b>Total Profit</b>	Rs=1,51,250/- Excluding expenditure		
<b>Cucumber-Malini</b>	After sowing 10 days 5 liter crude cotton seed oil+ 500ml Emulsifier given & after 20 days interval	Rs=11000/-	[Seed-Rs=250/-; Oil (10 lit.) Rs=750+Labour Rs=9000/-]
<b>Yield</b>	50 quintal	50X4000=Rs=2,00,000/-	
<b>Net Profit</b>	[Rs=2,00,000/-] - [Total Expenditure Rs=9000/-]= Rs=1,91,000/-		
<b>Total Profit</b>	Rs=1,91,000/- Excluding expenditure		

**Table 3 shows that total Profit from Three Acre Plot from All Four Crops**

Name Of Crop	Net Profit	Total Expenditure	Total Profit
<b>Pigeonpea/ Red Gram</b>	Rs=2,43,000/-	Rs=13500/-	Rs=2,29,500/-
<b>Bitter Gourd</b>	Rs=1,20,000/-	Rs=10000/-	Rs=1,10,000/-
<b>Quora</b>	Rs=1,60,000/-	Rs=11000/-	Rs=1,49,000/-
<b>Cucumber</b>	Rs=2,00,000	Rs=11000/-	Rs=1,99,000/-
<b>Total All Crop</b>	Rs=7,23,000	Rs=45,500/-	Rs=6,77,500/-



**Figure 2. Shows Net, gross profit from all different four crops in an Agronomical year**

### 3. Results & Discussion:

Oils are non-soluble in water but ethoxylate (Emulfire) make it water soluble, to make one liter oil water soluble, 100 ml of ethoxylate is sufficient, there are more than 2000 emulsifiers are exist such as egg yolk based emulsifiers, honey based emulsifiers, diglycerides, polysorbates, carrangeenan, guar gum and canola oil etc not only efficient but also not economic as compared to ethoxylate emulsifier therefore ethoxylate is efficient as well as economic and make all different five types of oil water soluble, so that we can use oils as fertilizers instead of chemical fertilizers. It as an effective organic fertilizer in the field.

More than double the income of the farmers by reducing expenditure using novel multiple crop system. Provide poison free vegetable to the society. Save the environment from air, water & soil pollution. Increase the yield organically by the novel multiple crop system. It is best alternative to uplift the farmer's life economically.

**Benefit to Society:** Society gets cost effective & quality of vegetables. It save the society from poisoning or it provides poison free vegetables & food grain to the society. It is more profitable for the farmers & safe to the society. It provides fresh air and water to the society by reducing its pollution.

**Advantages:** It saves the soil cultivation cost for second crop. It also saves labor cost and time of the farmers for the making climber for bitter gourd, Quora & cucumber crop. It not only gives second crop of Red gram as well as acts as a climber for the creeper.

**Future Plan:** It fulfills the need of 21<sup>st</sup> century, Field trial on different creeper crops.



**Figure 2. Shows that Red gram crop at different stages in an Agronomical year**

From table 3 and figure 2 it is clear that total expenditure on all four crops is decreasing and net profit from Pigeonpea/ Red Gram, Bitter Gourd, Quora, Cucumber are Rs=2,43,000, Rs=1,20,000, Rs=1,60,000, Rs=2,00000 respectively excluding the expenditure and total profit excluding from expenditure in an agronomical year from all four different crops which includes creeper crops and green pods of Pigeonpea as a second additional crop by the novel multiple crop management practices organically is 7,23000.

### 4. Acknowledgments

Great support from Dr. Rammanohar Mishra, Principal of the Amolkachand Science College Yavatmal, and Dr. P.R.Rajput Principal of SSSKR Innani Science College, Karanja lad District Washim, Maharashtra, India.

### References:

1. Cole, D.J.; Hill, V.R.; Humenik, F.J.; Sobsey, M.D. "Health, safety, and environmental concerns of farm animal waste", *Occup. Med.* 1999, 14, 423-448.
2. McGarvey, J.A.; Miller, W.G.; Sanchez, S.; Stanker, L. "Identification of bacterial populations in dairy wastewaters by use of 16S rRNA gene sequences and other genetic markers", *Appl. Environ. Microbiol.* 2004, 70, 4267-4275.
3. Elder, R.O.; Keen, J.E.; Siragusa, G.R.; Barkocy-Gallagher, G.A.; Koohmaraie, M.; Laegreid, W.W. "Correlation of enterohemorrhagic Escherichia coli O157 prevalence in feces, hides, and carcasses of beef cattle during processing", *Proc. Natl. Acad. Sci. USA* 2000, 97, 2999-3003.
4. Pell, A.N. Manure and microbes: Public and animal health problem? *J. Dairy Sci.* 1997, 80, 2673-2681
5. Rasmussen, M.A.; Casey, T.A. "Environmental and food safety aspects of *Escherichia coli* O157:H7



- infections in cattle”, *Crit. Rev. Microbiol.* 2001, 27, 57-73.
6. A.K. Ghimera, C.W. Jin, B.K. Ghimire, D.H. Che, “Antioxidant activity and quantitative estimation of *Azadirachtin* and *Nimbin* in *Azadirachta indica*”, *African Journal of Biotechnology* 54 (2009)1684–5315.
  7. DeWaal, C.S.; Tian, X.A.; Plunkett, D. Outbreak Alert! 2009, “ Center for Science in the Public Interest”, 3 March 2015.
  8. Lynch, M.F.; Tauxe, R.V.; Hedberg, C.W. “The growing burden of food borne outbreaks due to contaminated fresh produce: Risks and opportunities”, *Epidemiol. Infect.* 2009, 137, 307–315.
  9. R. Subapriya, S. Nagini, “Medicinal properties of Neem leaves: A Review Source”, *Current Medicinal Chemistry - Anti-Cancer Agents*, 5 (2005) 149-156.
  10. S.S. El-Hawary, M.E El-Tantawy, M.A. Rabeh, W.K. Badr, “Chemical composition and biological activities of essential oils of *Azadirachta indica* A. Juss”, *International Journal of Applied Research in Natural Products*, 6 (2013) 33-42.
  11. Indra Prasad Pandey, Sayed Farooq Ahmed, Suman Chhimwal, Shalini Pandey, “Chemical composition and wound healing activity of volatile oil of leaves of *Azadirachta indica* A. juss”, *Advances in Pure and Applied Chemistry* 62 (2012) 2167-0854.
  12. Gaddamwar A.G, Rajput P.R, “Influence of constituent of coconut water on Fenugreek plant”, *International journal of Herbal Medicine*, vol. 1,(2013), issue 2, pp.162-168.
  13. Gaddamwar A.G, Rajput P.R, “Physico-Chemical Analysis of Rain Water to Predict Polluted, Un polluted Regions of Vidharbha and Its Impact on Agricultural Crops, *Journal of water research and development*, vol. 2, (2012), issue (1&2), pp.54-58
  14. Gaddamwar A.G, Rajput P.R, “Analytical study of Bembala damp water for fishery capacity, portability and suitability for agricultural purposes”, *International Journal of Environmental Sciences*, vol. 2, (2012), issue 3, pp.1278-1283

