



# 'De-risking Tomato Monocultures'

Experiences on Introducing Crop Diversification & Natural Farming Methods in High Value Tomato Monocultures



An initiative supported by Azim Premji Foundation







**T**omato cultivation is often equated to gambling! High price volatility in markets makes monocropping of tomato highly risky; often forcing farmers into debt trap and distress.

Madanapalli area of Chittoor District in Andhra Pradesh is one of the largest intensive tomato producing areas in the country. Among others, this highly commercial crop system was a challenging problem to deal with in the clusters taken up under the Climate Resilient Natural Farming program by APCNF and WASSAN. The program is supported by Azim Premji Foundation.

As a step in promoting Natural Farming methods, Poly Cropping was introduced in the tomato fields. Various models evolved along with farmers' experimentation. The mono-crop system is diversified and farmers are able to recover the cost of production from the intensified intercrops. This is insulating farmers from Price Risks of tomato; as the main crop comes at almost zero cost.

The results are encouraging and more and more farmers in the cluster are intensifying their farms.

Farmers' experiences and the models evolving are shared in this document.





## De-Risking Tomato Monocultures

Like most of the rainfed farmers in his area, Krishna Reddy of Cherukuvaripalli village used to go for a single crop every year, until last year. Though he had 2.37 acres of land, irrigation facility is there only for 1.37 acres. Leaving the remaining land barren, Krishna used to cultivate mono-crop of Tomato in the irrigated land; often subjected to price risks.

Krishna Reddy went for poly cropping introducing vegetables and greens along with Tomato. Though there were losses in main tomato crop, he could recover costs from the intercrops.

For Nagaraju, a migrant labour from Samadhiguttapalli, it was a much greater relief amidst the Covid crisis that forced him to return to his native village from Bengaluru. The leased land of 2 acres in which he went for Poly Cropping has given him a new lease of life. The experiences of these farmers have given a new direction to many other farmers in Madanapalli area to minimize their risk in Tomato cultivation. They are slowly coming out of this Mono-cropping pattern and looking up Poly-cropping as a productive and risk minimizing strategy.

**... I had invested Rs 42150/- on tomato cultivation realizing a gross income of Rs 31660/-; with a net loss of Rs 10490/-.**

**As I went for Poly-Cropping, such losses were not only balanced but also helped me to be on the positive side. Indeed it is a great relief ...**

Krishna Reddy  
P. Cherukuvaripalli village of Chittoor district,  
Andhra Pradesh.

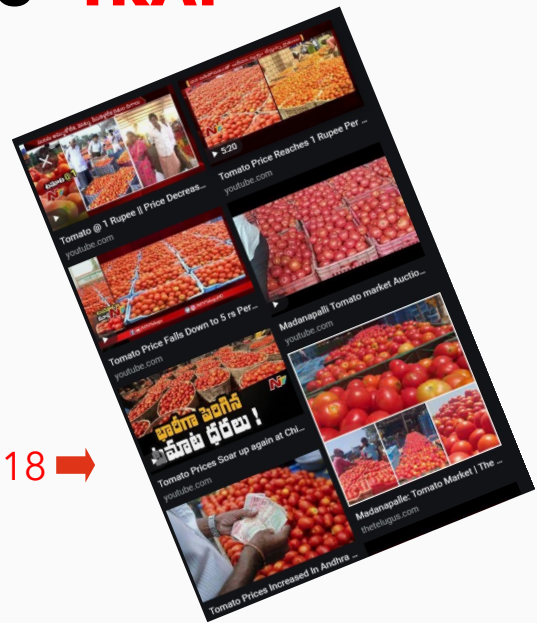




# Big Market - Tomato 'TRAP'



← 2017



2018 →



← 2021



*Madanapalli Tomato Market is a regular source of news, for local and national media, as it feeds either a negative or a positive news related to Tomato prices, season after season, year after year. High price volatility is the hall mark of Madanapalle market, one of the largest tomato markets in India.*

The local climate and soil conditions of Madanapalli are conducive for Tomato cultivation. Tomatoes cultivated by small-scale & marginal farmers of the surrounding villages of Madanapalle, and also from Chittoor & Kadapa districts of Andhra Pradesh reach this market. From here, these are exported to other states and nearby countries. The off-take of this market is in the range of 800-1000 tonnes per season in normal conditions. Tomato price in this market decides the fate of local farmers for that season; eternally trapping them in the vicious cycle of losses -debts and some times prosperity.

The volatility is indeed very sharp as the prices change drastically within a week. To illustrate a case - in August 2018, it was Rs 6 Kg in a week; by the next Monday it was down to Rs 1.60 per Kg. In the beginning of the same year, it was in the range of Rs 20-25 per Kg. The prices started falling down from July onwards. By August, the price came down to almost Rs 1 kg. There are many reasons for such fluctuation in prices. Volume of production, imports from neighboring places, reduced demand are some of the reasons. Under these circumstances, irrespective of good yields, farmers are unable to get even their costs back, resulting into a huge financial burden on them.





Purushsottham Reddy is one such small tomato farmer from Samadhiguttapalli village of Kandur mandal. He incurred losses for almost 5 years, out of the previous 7 years. *Even for those 2 years, he could barely manage to recover costs. Remaining 5 years, he incurred loss in the range of Rs 40000 - 42000 per year. "Hoping for the returns year after year, I continued with Tomato cultivation..."*, he says.



Purushsottham Reddy,  
Samadhiguttapalli Village of  
Kandur Mandal.

## Vicious Cycles

Considering the possible high returns and positive local conditions, some farmers with financial capital from districts surrounding Madanapalli (Kadiri/Anantapur) entered into villages near Madanapalli area. The farmers started taking lands on lease from local farmers. Investing heavily on chemicals, these outside farmers initiated intensive monocrop tomato cultivation, without much concern for soil health. Some of them even invested about Rs.5.0 lakhs per acre in expectation of high yields that may get about Rs.20 lakhs in return in favorable conditions. Such farmers have high risk taking ability.

With even small and marginal farmers emulating them taking loans with high interest, once into heavy losses, the need to continue with tomato crop increases in the expectation of a good year to repay the debts.

**... Here farmers having some irrigation facility will definitely go for Tomato. If market and rates are good, the returns would be good. But there is other extreme. When market is unfavourable, we have no choice, except to throw the yields on the road or leaving the field unharvested, just to avoid the additional costs for labour, market commission and transport. In such situation, it's a heavy burden for small and marginal farmers; and, it pushes them into a debt trap ...**







## Crop Diversification and Intensification of Tomato Crop Systems



### OBJECTIVES

- The overall objective is to introduce natural farming methods in tomato based crop systems without usage of plastics.
- The starting points however are:
  - ◇ reduce the risks in tomato cultivation through diversification,
  - ◇ increase the crop cover on the soil for longer months and
  - ◇ reducing cost of cultivation by replacing chemicals with natural-inputs.

**... The advice of taking up poly crops along with Tomato has given us needed cushion. We could meet the cost of production to a large extent with Poly crops. We had an opportunity to get some income even after complete harvest of main crop. Otherwise it would have been more mess in our lives ...**

says Nagaraju, a farmer who returned to his village from migration and started cultivating Tomato by taking some land on lease. Initially, he tasted bitter experience with Tomato crop; not able to recover enough returns even to pay the lease amount. He had to depend on loans from close relatives.

## Introducing Poly Cropping to 'DeTrap' Tomato Farmers

It all started with a small initiative in 2019 by WASSAN under a program supported by Azim Premji Foundation (APF) under the AP Community Natural Farming (APCNF), a program of Government of Andhra Pradesh anchored by Rythu Sadhikara Samstha (RySS).







The experiments started with the purpose of extending the crops and soil cover in tomato fields to cover soil round the year. Initially, 8 farmers from Kandur and Bommanacheruvu clusters near Madanapalli area came forward to try Poly cropping in 9.5 acres of land during Rabi 2019. They also consciously chosen to take up vegetable cultivation only after completing the harvesting of Tomato.

Pursushottam Reddy was one among such farmers. He had 3 acres of land in Cherukuvaripalli village in Kandur Cluster. He is also working as a cluster level resource person (CRP) in the APCNF program. He wanted to try this method, for self-exploration as well as to demonstrate it other farmers.

***“The continuous losses with Tomato crop prompted me to try something new. In fact, I got good yields in Tomato even earlier, but as there was no price, I incurred losses. I wanted to explore the possibility recovering losses in tomato wit some other crops, in the same field. Earlier my Uncle tried this and his experience also motivated me... After taking final harvest of Tomato, I went with some Vegetables and Leafy vegetables in one acre of land. And results were an eye opener for me ...***

says Reddy. The income from these Poly - crops saved him from losses in Tomato cultivation during that year; it helped him in making some profits.



The story of Nagaraju, a migrant labour who returned to his village provides another narrative. He is a land less labour, used to go to places like Bangalore and Thirupati in search of work. Covid lockdown curtailed his options further and he had to stay back in the village with no means of livelihoods. It prompted him to take some land on lease for Tomato cultivation. Apart from the loan his wife took from her Self Help Group, he borrowed some money from his relatives. He invested over Rs 103,000/- for Tomato cultivation, but finally got a gross income of only Rs 81,500/-, through 5 times of harvesting. His choice of going for poly cropping has given him the most needed relief. He could reduce the losses in Tomato almost half as he got good returns from vegetables and leafy vegetables. Though finally he had to incur losses, the burden has lessened a lot.





## “Poly Cropping put me on Positive Side”

“For the main crop Tomato, I have invested Rs 52150/- but got an income of Rs 31660, resulting into a loss of Rs 20490/-. It was completely a different story with Multi crops, as I got a profit of Rs 34325/- on them.



The income from different leafy vegetables is presented in the Table. On the whole he got gross income of Rs 42285/- from these Multi Crops over an investment of just Rs 7960 /-. Indeed it was a big relief as this income was almost regular for 5 months. First month I got Rs 17,065/- 2nd month Rs 6720/-, 3rd month Rs 4400/-, 4th month Rs 9600/- and 5th month Rs 4500/”

... I ploughed the land after taking final harvest in May- June; then I sowed some leafy vegetables and vegetables with which I got regular income from June - November. Creeper varieties of vegetables provided me income during December - March. In that way, I got income consistently through these crops...” explains Reddy...

### INVESTMENT AND RETURNS ON VEGETABLES / LEAFY VEGETABLES

Crop Varieties	Total Investment (Rs)	Total Return (Rs)
Fenugreek (మెంతికూర)	240	5000
Palak (పాలకూర)	150	3300
Chukka Aaku (చుక్కాకకు)	300	4350
Coriander (ధనియాలు)	200	6700
Chakranthiakku (చక్రాంతాకు)	120	2300
Radish (ముల్లంగి)	400	3675
Ridge gourd (బీర)	500	2760
Beans (బీన్స్)	600	6800
Bitter gourd (కాకర)	500	6400

	Total Investment (Rs)
Labour cost for staking	15000
Ghanajeevamrutham	750
Dravajeevamrutham	200
Labour cost for harvesting	2500

Total Investment (Rs)	Total Return (Rs)
7960	42285





## “Had I not done this, It would have been more fatal”

“...For a landless labour like me, having consistent income for almost 5 months in this Corona period is literally a blessing in disguise. In fact it's a gamble that I took 2 acres of land on lease and went for Tomato cultivation. On some good advice, I cultivated vegetables and leafy vegetables, along with main crop. I followed the suggestions given by local resource persons and farmers who have earlier tried out this method. Had I not done this, it would have been more fatal gamble for me, as there was huge loss in Tomato.” - Nagaraju, Samadhiguttapalli village.



... I had a loss of Rs 21500/-on Tomato; but on the investment of Rs 9900 for Vegetables and Leafy Vegetables, I have got an income of more than Rs 19500. Even if the investment is deducted, it means there is a profit of nearly Rs 10000. With this, half of the losses in Tomato is covered. Though finally I had to incur losses, the burden is lessened...” explains Nagaraju...

### INVESTMENT AND RETURNS ON VEGETABLES / LEAFY VEGETABLES

Crop Varieties	Total Investment (Rs)	Total Return (Rs)		Total Investment (Rs)
Gonugura	100	5825	Labour charge for planting	300
Asparagus	250	1800	Ghanajeevamrutham	600
Radish	600	2750	Dravajeevamrutham	200
Cucumber	375	2232	Labour charge for inter cultivation	2000
Ridge gourd	500	3080	Labour charge for picking	3500
Fenugreek (మొలకూర)	350	1805		
Lettuce (పాలకూర)	250	2010		
			<b>Total Investment (Rs)</b>	<b>Total Return (Rs)</b>
			9900	19502

There are many such farmers in other villages of Chittoor and Ananthapur in the APCNF clusters, who have been trying this Poly cropping method. In the previous Kharif (2021), 109 farmers have adopted this method in an extent of nearly 97 acres in Chittoor District. Interestingly they are adopting their own approach in implementing this method. Some farmers opted for trying poly cropping at the end of harvesting their main crop.

Various crop combinations were tried by farmers within the frame of diversification and poly cropping along with practicing Natural Farming methods such as application of *Ghana Jeevamrutham* and *Drava Jeevamrutham*, and application of various botanical extracts.



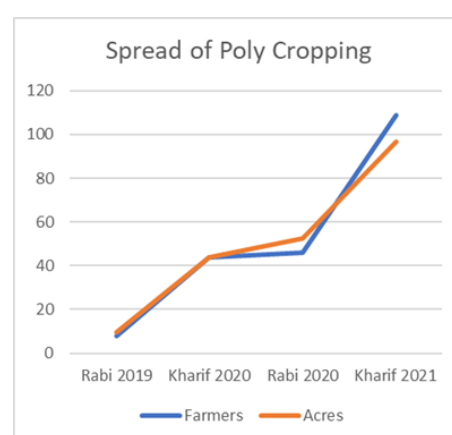


### YEAR WISE POLY CROP UPTAKE IN CHITTOOR DISTRICT

Sl. No	Name of the Cluster	No of Villages	Rabi'2019		Kharif'2020		Rabi'2020		Kharif'2021	
			No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres
1	Ayyavaripalli	6	0	0	2	1.75	5	6.5	19	15
2	Bommanachervu	9	5	5.5	25	28.5	21	22.5	39	35.5
3	Kandur	8	3	4	15	11	16	18.5	36	33
4	Thamballapalli	6	0	0	2	2.5	4	5	15	13
	<b>TOTAL</b>		<b>8</b>	<b>9.5</b>	<b>44</b>	<b>43.75</b>	<b>46</b>	<b>52.5</b>	<b>109</b>	<b>96.5</b>

## Different models of Poly Cropping

Experimentation by farmers have led to emergence of **3 Models** - **[Model 1]**: Mixed Inter Cropping; **[Model 2]**: Row Inter Cropping; **[Model 3]**: Multi Crops Continuation. Each of these models has its own features in terms of cultivation method and benefits. The significance also lies in the flexibility in farmers choosing the models by farmers considering their field situation and crop strategy. The progressive adaptation of these models in the program areas from 2019 to 2021 is detailed below.



Sl. No	Name of the Cluster	No of Villages	Rabi'2019		Kharif'2020					
			Model-1		Model-1		Model-2		Model-3	
			No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres
1	Ayyavaripalli	6	0	0	0	0	2	1.75	0	0
2	Bommanachervu	9	5	5.5	5	8.5	20	20	0	0
3	Kandur	8	3	4	6	5.25	7	5	2	0.75
4	Thamballapalli	6	0	0	0	0	2	2.5	0	0
	<b>TOTAL</b>	<b>29</b>	<b>8</b>	<b>9.5</b>	<b>11</b>	<b>13.75</b>	<b>31</b>	<b>29.25</b>	<b>2</b>	<b>0.75</b>

Rabi'2020						Kharif'2021					
Model-1		Model-2		Model-3		Model-1		Model-2		Model-3	
No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres	No of Farmers	Acres
2	1.75	3	4.75	0	0	11	7.85	8	7.15	0	0
10	13.5	11	9	0	0	22	25.5	17	10	0	0
8	9.25	6	7.5	2	1.75	17	20	15	9.5	4	3.5
1	0.5	3	4.5	0	0	5	6	10	7	0	0
<b>21</b>	<b>25</b>	<b>23</b>	<b>25.75</b>	<b>2</b>	<b>1.75</b>	<b>55</b>	<b>59.35</b>	<b>50</b>	<b>33.65</b>	<b>4</b>	<b>3.5</b>



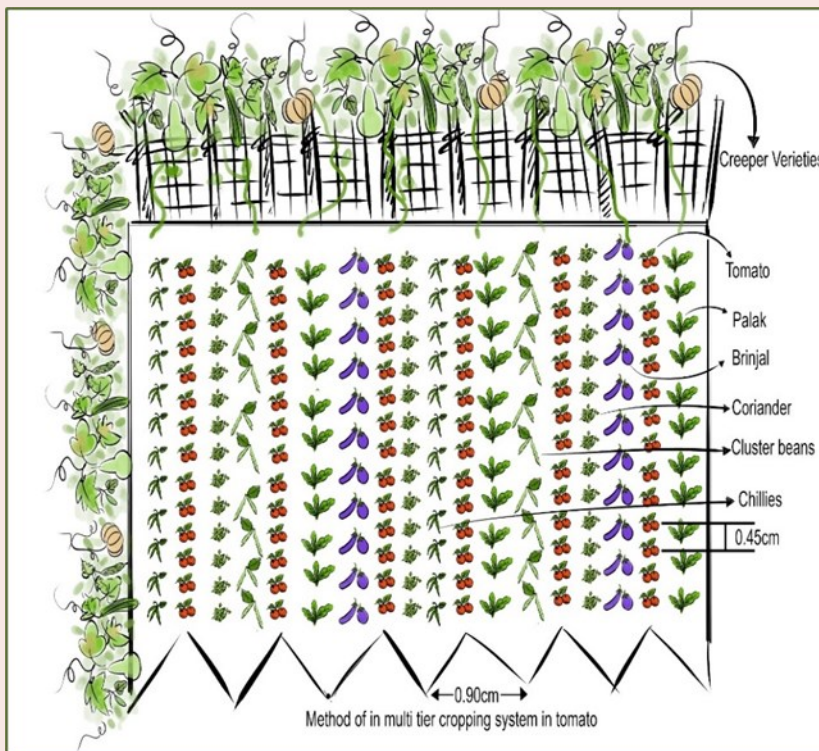


# Poly Crop Models

## [1] MIXED INTER CROPPING

Tomato is the main crop in this model. It is planted in the middle of the bed. After 15 days, selected leafy and other vegetables will be planted along the side slopes of the same bed. A distance of 45 cm would be maintained between Tomato plants and 30 cm in vegetables. Creeper vegetables are planted around the fields as Border Crops. Vegetables and two harvests can be taken up for leafy vegetables during the main crop duration.

- Planting Tomato Seedlings:** As part of land preparation, all the waste material is removed from the field. After preparing furrows, beds are raised and drip pipes set up on the beds. The bed is covered with plastic mulch (a prevalent practice though not encouraged in NF). Holes are made in the middle on this plastic mulch with a pipe, ensuring 45 cm distance between them. Tomato seedlings brought from nearby nurseries are sown in these holes. These are allowed to grow for 30 days; then these plants are staked (tied to with a thread to wooden stakes) to support the growing plant.
- Planting Vegetables and Leafy Vegetables:** 15 days after sowing Tomato, vegetable seeds such as Brinjal, Cluster beans, Chillies, along with seeds of Leafy Vegetables are sown on the side slopes of the Tomato bed, alternatively, row by row by ensuring a distance of 30 cm between plants. E.g. on the side slopes of a Tomato bed, Palak at one side, Brinjal at other side are sown. For the next row of Tomato bed, Coriander at one side and Cluster bean at other side are sown. At one end seeds of vegetable and at the other end seeds of Leafy vegetables are taken up alternatively in each row. Leafy vegetables can be harvested within 30-60 days. After first harvest, greens can be resown for 2nd harvest, as there will be still time for harvesting of Tomato.



### CROP COMBINATION

#### Main Crop: Tomato



#### Inter Crops: Leafy Veg., Vegetables



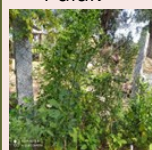
Palak



Coriander



Brinjal /  
Cluster Bean



Chilli

#### Boarder Crops: Creeper Varieties



Ridge  
gourd

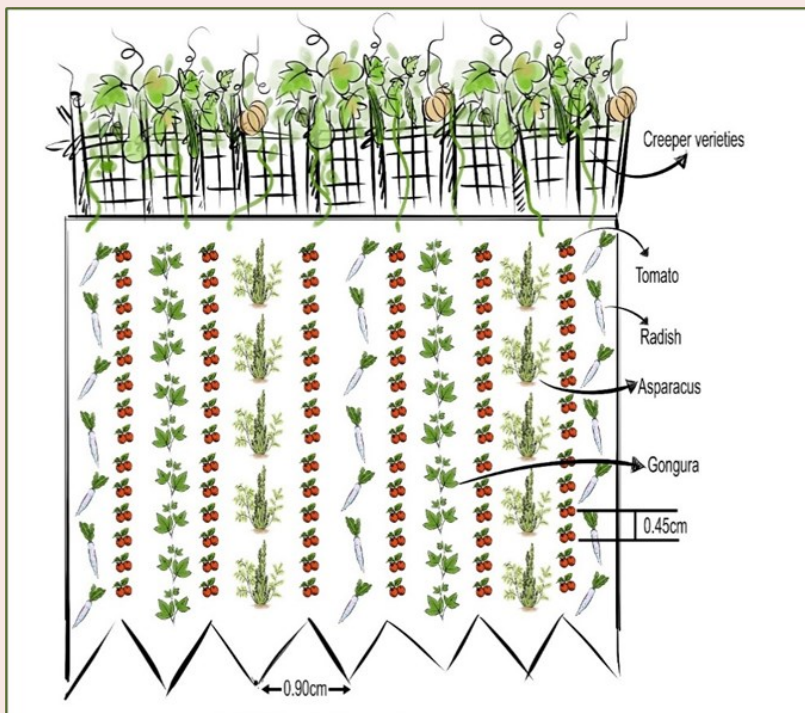




## [2] ROW WISE INTER CROPPING

Here also Tomato is the main crop; Vegetables, Leafy Vegetables are grown in rows simultaneously & alternatively, as intercrops. Creeper varieties are planted around the field as Border Crops.

- Planting Tomato and Vegetable Seeds:** All the preparation practices for planting the seedlings like preparing land, removing the waste material, preparing furrows etc. are same as in the 1st Model. But here tomato is sown in rows, alternatively with vegetables & leafy vegetables. For example, a row of tomato, followed by one row of vegetables and one row of leafy vegetables. 15 days after sowing tomato, vegetable seeds such as Radish are sown. A distance of 45 cm between plants is ensured.
- Sowing Leafy Vegetables:** This can be done while sowing vegetable seeds. Leafy vegetables are sown in alternate rows, with 45 cm distance in between the plants. These can be harvested in between 30-120 days. After harvesting first crop, greens can be sown for the 2nd harvest, as there will be still time for harvesting of Tomato.



### CROP COMBINATION

#### Main Crop: Tomato



#### Boarder Crops: Creeper Varieties



Ridge gourd



Cucumber

#### Inter Crops: Leafy Veg., Vegetables



Gongura



Palak



Radish

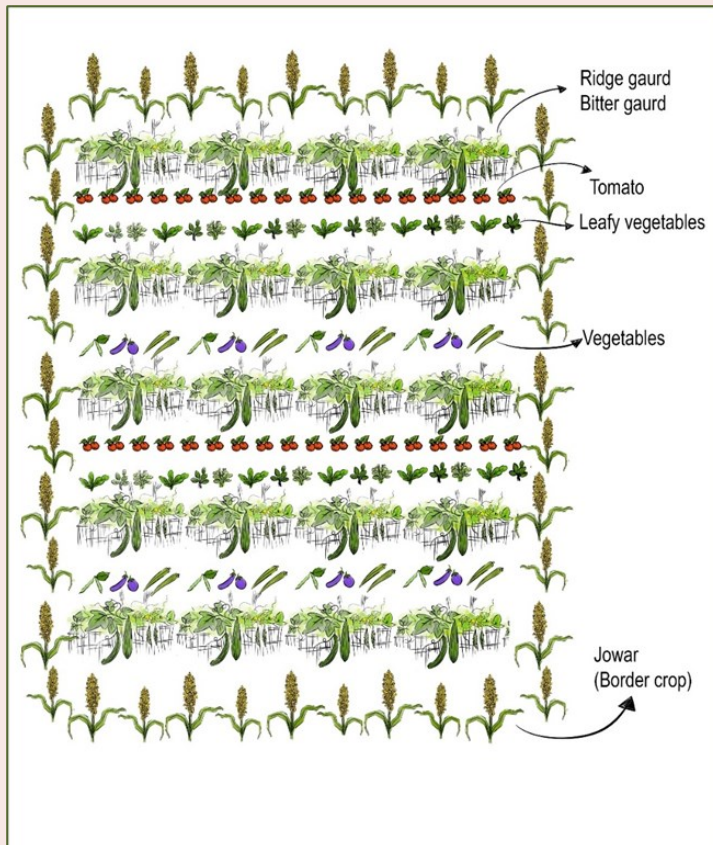




### [3] MULTI CROPS CONTINUATION

Apart from main crop Tomato, more than 5 varieties of vegetables, leafy vegetables are cultivated in this model, **throughout the year**. Creeper varieties are planted as *continuation crops* along the existing sticks in Tomato field, when it is in the final stage of harvesting. Crops like Jowar would be there as Border crops.

- Planting Tomato Seedlings:** All the preparation practices for planting the seedlings like preparing land, removing the waste material, preparing furrows etc are same as in the 1st Model above. But here Tomato seedlings are planted in the middle and vegetables are sown in side slopes. At the final harvesting stage of Tomato, seeds of some creeper varieties like Ridge Guard, Bitter Guard are sown, as continuation crops.
- Planting Vegetables and Leafy Vegetables:** 15 days after planting Tomato seedlings, Vegetables like Radish, Beans, Sorghum and Chilies etc. are sown along with main crop. Creeper vegetables can be planted during the final harvesting stage of Tomato. Leafy vegetables are sown along with vegetables. After the first harvest leafy vegetables are re-sown for 2nd harvest, in the same beds.



#### CROP COMBINATION

##### Main Crop: Tomato + Creeper Varieties



##### Multi Crops + Boarder Crops

Vegetables + Leafy Vegetables + Jowar







## “Poly Crops saved me from losses”

... I could get a total income of Rs 25625/- in a span of 5 months. Indeed income was there from 1st month onwards from leafy vegetables like Palak & Coriander. I could get such income intermittently every month, for almost 5 months - Rs 6450 (1st month),



Rs 1750 (2nd month), Rs 9035 (3rd month), Rs 6510 (4th Month) and Rs1880 (5th Month). These returns with poly crops have not only saved me from the losses in main crop, finally they have put me on positive side... says Krishna Reddy

"...I followed this poly crop model in 1.10 acres of land. Initially I cultivated Tomato and after complete harvesting, I could only see losses in this crop. I invested an amount of Rs 42150 for Tomato cultivation, finally I could get an income of Rs 31,660/-; it is a loss of Rs 10490/-.

Then I tried cultivating vegetables and leafy vegetables in the same field. Some local resource persons and fellow farmers guided me for that. I have sown vegetables like Cluster Beans, Chillies, Brinjal, Ridge gourd, Cowpea, along with leafy vegetables like - Fenugreek (Menth), Palak, Chukkaku, Chakranthaku and Coriander. While vegetables were sown only once, I could plant and harvest all the leafy vegetables twice. The total investment on vegetables and leafy vegetables was Rs 6170/- including costs for labour and bio fertilizers (Drava Jeevamrutham and Ghana Jeevamrutham);

### INVESTMENT AND RETURNS ON VEGETABLES / LEAFY VEGETABLES

Crop Varieties	Total Investment (Rs)	Total Return (Rs)
Fenugreek (మెంతికూర)	175	3750
Palak (పాలకూర)	25	1700
Chukkaku (చుక్కకూర)	200	2350
Coriander (కొత్తిమీర)	100	5200
Chakranthaku (చక్రాంతాకు)	120	2300
Cluster beans (గోరుచిక్కుడు)	100	1520
Chilly (మిరప)	75	2385
Brinjal (వంకాయ)	200	2430
Ridge gourd (బీర)	200	1590
Cowpea (అలసంద)	25	2400

	Total Investment (Rs)
Labour charge for threads re-tied	1500
Ghanajeevamrutham	750
Dravajeevamrutham	200
Labour charges for harvesting	2500
<b>Total Investment (Rs)</b>	<b>Total Return (Rs)</b>
6170	25625



# Application of Natural Farming Practices

Another interesting part of this experience is the adoption of natural farming practices by farmers. While growing vegetables, leafy vegetables, creepers along with Tomato, farmers have applied *Ghanajeevamrutham*, *Dravajeevamrutham* in their field. Saplings were treated with *Beejamrutham*. The details of the NF practices they adopted are as below;

- Type- 2 Ghanajeevamrutham:** On an average, farmers used 2 Tonnes of Type-2 *Ghanajeevamrutham* per acre. As part of preparation, 20 litres of *Drava Jeevamrutham* was added directly to 200 Kgs of FYM in the compost pit; mixed it both together well in the compost pit and after mulching for 4 days; and then it was applied to the field.
- Saplings treatment with Beejamrutham:** Tomato seedlings taken from the nursery were thoroughly immersed in the *Beejamrutham*, in a way roots are completely treated. The seeds of other selected inter crops were also treated with *Beejamrutham*. For preparing *Beejamrutham*, 5 Kg of Desi Cow dung, 5 Liters of Cow Urine was mixed with 20 ltrs of water in a small drum Or bucket. 50 gms of Calcium and a handful of field soil was added to it. It was kept for 12 hours and then used for seed treatment.
- Dravajeevamrutham:** Farmers mostly applied *Dravajeevamrutham* through drip systems after transplanting Tomato and other crops. It was applied regularly whenever watering is done to the field. For preparing *Drava Jeevamrutham*, 10 Kg of Desi Cow dung, 5 Liters of Cow Urine, 2 Kg of Jaggery, 2 Kg of Pulse flour and a fistful of soil (*Putta matti*) was used. After mixing well all these, it was kept for soaking for 4 days. On an average, farmers applied 200 liters of *Dravajeevamrutham* in an acre through drip method.







## ***Drava Jeevamrutham Unit (DJ Unit)***

Application of *Ghana* and *Drava Jeevamrutam* i.e. solid and liquid form of *Jeevamrutam* is pivotal to success in Natural farming. Household preparation of these inputs are encouraged. The process, collection of cow urine in particular, has become a serious constraint in farmers preparing these inputs in required quantities.

WASSAN has evolved a process of (semi) automation of collection of cow urine and preparation of *Drava jeevamrutam* to ease its supply bottleneck and make it easy for farmers to apply in large quantities. The unit runs on solar energy and is automated and is sold to farmers who do not want to prepare it by themselves.

Solar based *Drava Jeevamrutham* Unit was established in Malepadu village of Bommanachervu cluster in Madanapalle Mandal.

Malepadu village consists of 56 households, out of which 42 families have livestock. 10 families have Desi cows. Cattle sheds of 7 families with a total livestock of 39 animals were selected for establishing the *Drava-jeevamrutam* unit. These are small and marginal Dalit farmers.





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It was estimated that every month 468 litres of cow urine would be available from these 7 cattle sheds i.e. 5616 litres per year; after deducting losses availability would be 4212 litres per year. The unit was designed to use this volume. At the rate of 15 litres of *Drava Jeevamrutham* per one litre of cow urine, a total of 63,180 litres of *Drava Jeevamrutham* can be prepared from this unit. The total quantity of *Drava Jeevamrutham* required for the entire village was estimated to be around 47,400 litres. The farmers group decided to supply this at the rate of Rs 3 per litre for the farmers. Even after catering the entire village (237 acres), there would be a surplus of more than 9000 litres in this unit for outside sales.

The Unit was established as a business enterprise owned by a farmers' group. Farmers completed concrete flooring in their cattle sheds, with appropriate slopes to allow free and quick drainage of cow urine. Collection chambers were constructed at the outlet of cow sheds and all the collection chambers from 7 cattle sheds were connected to the pipeline draining into a larger collection chamber.

So far, 8500 litres of *Drava Jeevamrutham* was produced from this unit. Cattle shed owners used 1175 litres of *Drava Jeevamrutham* for their fields. And, 5625 litres of *Drava Jeevamrutham* was sold to other farmers in the village, at the rate of Rs 3/- per litre. Thus, the unit so far had a sales turnover of Rs 16875/-. A total of 76 farmers used this in their land of 136 acres.

**“ With monoculture of Tomato and large scale usage of plastic sheets for mulching - the Madanapalle area looks like a sheet of glass laid over ground reflecting sun! Tomato cultivation in this area has become a gamble with market prices; highly risky and unsustainable as a monocrop with plastic mulch often ploughed into the soil as farmers find it costly to remove it. Unregulated groundwater usage has a toll on the aquifers.**

**In our move towards de-risking Tomato cultivation through diversification, extending the crop period to longer duration and finding suitable alternatives to mulching, an initiative was taken up by WASSAN along with farmers to diversify Tomato monocrops.**

**Poly crop models were evolved initially to extend the cropping season beyond the harvest of main tomato crop using Natural Farming methods. Though much has to be done to move away from plastic mulch, the results of introducing natural farming and poly cropping are encouraging and fast spreading.**

**The experiences, the models evolved together with farmers and the results are shared in this document. The initiative is a part of AP Community Natural Farming program of Government of Andhra Pradesh and WASSAN is supported by Azim Premji Foundation. ”**





Bringing awareness among the farmers on losses with Mono-cropping, exploring suitable alternatives with better crop combinations, organizing exposure visits and interactions with farmers who followed Poly cropping, ensuring quality seed availability, extending hand holding support would definitely help in encouraging farmers to take up this approach, in a much bigger scale. Enabling them to adopt Natural Farming methods would help not only reduce costs but also in improving soil health in the long run. Exploring cost effective Bio-Mulching methods is need of the hour. Involvement of community, particularly women farmers, Village Organizations and Agricultural Department would immensely help in promoting Poly Cropping approaches in these rainfed villages..."

■ U. Sudhakar, WASSAN





# Learnings from Poly Cropping Experiences

Crop intensification with poly crops that will not compete with each other for space in time is a key element in natural farming.

Moving towards Natural farming has become a key strategy to moderate price risks even in such high risk/ return commercial farming like tomato.

Within a period of four seasons farmers' experiences evolved into various poly cropping models. These models are co-created by WASSAN team along with farmers by experimentation within a broader frame of natural farming. No financial support was given to farmers for these experiments, except for seeds in the first season. Different models evolved with farmers' choice and convenience. Using some of the natural farming practices has become the norm reducing chemical use. *Drava jeevamrutam* is applied through Drip irrigation.

The lands left earlier with plastic mulch shining under the sun after harvest of tomato, are now covered with thick canopy of crops for a larger part of the year.

The multiple crops are giving additional monthly income to farmers. They are recovering the costs of production through these multiple crops minimizing risk in tomato crop, as it comes at almost 'zero' cost.

Plastic mulch is still a major challenge to grapple with; used mainly for controlling weeds. Farmers are aware of the negative consequences and are exploring alternatives. *"...There is possibility for using groundnut husk for mulching but it increases costs. The cost for this plastic cover is around Rs 2000; the cost for 1 Kg ground nut husk is around Rs 3/-; nearly 10 tonnes of husk is needed to cover an acre of land. It would amount to Rs 20000 to Rs 30000 which is huge amount in terms of costs.*

*How can we afford it?"* .. was the question before the farmers.

The multiple crops taken up provides regular income: leafy vegetables within 30-45 days; tuber vegetables in 45-60 days; other vegetables in 60-90 days; and Tomato, after 90 days of sowing. Some farmers went for a 2nd sowing of greens adding another harvest before tomato. After final harvest of Tomato, they are getting produce from creeper vegetables.

The crop system provides vegetables for self consumption for most part of the year. Multiple crops mixed with pulses, breaks the mono-cropping cycles of tomato and improve soil health.

Farmers are able to sell their produce in the local shandies and nearby markets like Kalikiri & Kandur. Women among these farmers are happier, as they feel that they are able to get diversified and healthy food in the form of these vegetables.

**Farmers' experiences in this highly commercial and heavy chemical input mono-crop system above all, exemplifies the potential of natural farming methods in de-risking farmers, make their homes, lives and soil more**







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