#### FORM-C :NEW TECHNICAL PROGRAMME

1.	Experiment number and title	:	20.7.34
			Study on comparative performance of natural and organic farming in dragon fruit ( <i>Hylocereus polyrhizus</i> L.)
2.	Budget Head	:	12088
3.	Collaborative department, if any	:	-

4. Background information

Dragon fruit (Hylocereus spp.), a herbaceous perennial climbing cactus, widely known as Red Pitaya, has recently drawn much attention among the Indian growers, not only because of its attractive red or pink color and economic value as fruit, but also valued for its high antioxidant potential, vitamins and minerals content. Being a native of Southern Mexico, Guatemala and Costa Rica, dragon fruit was introduced in India during the late `90s and still the area under its cultivation is gradually increasing. Farmers in the Indian states of Karnataka, Kerala, Tamil Nadu, Maharashtra, Gujarat, Orissa, West Bengal, Andhra Pradesh and Andaman & Nicobar Islands have already taken up its cultivation, and the estimated total area under Dragon fruit cultivation.

In the present scenario, both the state and central Government is focusing on natural/ organic farming for achieving sustainable productivity, food security as well as food safety. Therefore, it is a need to find out the efficiency of natural and organic farming on crop productivity and soil health in dragon fruit. Keeping above facts in sight, the present experiment is planned.

5.	Objectives		: (1) (2)	To compare th natural farming To assess the natural farming	ne effect of organic and on yield of dragon fruit e effects of organic and on soil properties
6.	Investigators		:		
	PI	Dr. A.R.	Kaswala, As	so. Prof. & Hea	id, NRM, ACHF, Navsari
	Co-Pl	Dr. P. K	. Dubey, Ass	istant Professor	, NRM, ACHF, Navsari
	Associate	Dr. Jilen	Patel, Assis	tant Professor,	PHT, ACH, Navsari
		Dr. B. M	. Tandel, As	soc. Prof., Fruit	Science, ACHF, Navsari
7.	Location & Agro-cl region	limatic s	ub- : Org Sou	anic Farm Unit, ith Gujarat Heav	ACH, NAU, Navsari vy Rainfall Zone (AES-III)
8.	Year and season		: Per	ennial, 2024-25	
9.	Crop & variety		: Dra	gon fruit, variety	y- Red flesh
10.	Experimental detai	ls	:		
	(a) Treatments		: M <sub>1</sub> ·	Natural farmin	g module
			M <sub>2</sub> ·	- Organic farmir	ng module (Low input)
			M <sub>3</sub> ·	- Control (100%	RDN)
M₁	- Natural farming		M <sub>2</sub> - Organ	ic farming	M <sub>3</sub> - Control
i)	Application of ghan-jiva 1.5 kg/pole (2 t/ha), also 2000 kg FYM/ha (1.5 k pole) in three equal spli first at mid march, seco mid June and third at m September and in succe	imrut i) o add cg/ ts <i>i.e.</i> nd at id ceding ii)	Application compost/ j equal split mid march, June and September Gliricidia	of 6 kg pole in three s <i>i.e.</i> first at second at mid third at mid based	<ul> <li>i) Application of 12 kg compost/pole in three equal splits <i>i.e.</i> first at mid march, second at mid June and third at mid September.</li> <li>ii) <i>Gliricidia</i> based</li> </ul>

year reduced 25% dose of FYM.

- ii) Application of Jivamrut 1 lit/pole (1250 lit/ha).
- iii) Weed mulching (Whatever weeds comes out from field)
- iii) Foliar application of jivamrut (20 lit jivamrut in 200 lit water/ha), starting from April to July at 15 days interval.

#### Plant protection

brahmastra, agnistra, dasparni ark and sour butter milk if

Application of Neemastra,

required (b)

formulation (GBF) 1 lit/ pole (1250L/ha).

iii) Foliar application of 2% GBF, starting from April to July at15 days interval formulation (GBF) 1 lit/ pole (1250L/ha).

iii) Foliar application of 2% GBF, starting from April to July at15 days interval

#### **Plant protection**

Application of Bio-pesticides, botanicals etc. if required

1333 poles/ha (Four plants are planted in one pole)

- **Design** : Large plot technique (CRD)
- (c) **Replications** : 10 (10 sampling area)

1

2

- (d) Plot size : 15 m x 10 m
- (e) **Spacing** : 2.5 m x 3.0 m
- (f) Seed rate
- (g) Manures & fertilizer : 540 g N per pole
- (h) Any other detail, if
  - required

# 11. Observations to be recorded

#### A. Growth and yield

- i) No. of fruits per pole
- ii) Fruit breadth (cm)
- iii) Fruit length (cm)
- iv) Fruit weight (g)
- v) Yield (kg/pole)
- vi) Yield (t/ha)
- B. Quality
  - i) TSS (<sup>0</sup>Brix)
  - ii) Shelf life (days)
  - iii) Ascorbic acid (mg/100 g)
  - iv) Total sugar (%)
  - v) Reducing sugar (%)

#### C. Soil properties (Initial and final)

- i) Soil pH and EC
- ii) Organic C (%)
- iii) Available N, P and K (kg/ha)
- iv) Total microbial population (cfu/g)

12. Methodology

: -

1.	Experiment number and title	:	20.7.35
			Study on comparative performance of natural and organic farming in onion ( <i>Allium cepa</i> L.) under south Gujarat region
2.	Budget Head	:	12088
3.	Collaborative department, if any	:	-

4. Background information

Organic cultivation offers one of the most sustainable farming systems with recurring benefits not only in long term soil health but also in providing stability in production by imparting better resistance against various biotic and abiotic stresses. Consumer demand for organically grown vegetables is steadily increasing all over the world for both domestic and export market. This drastic change is due to human concern over health which made him to produce pesticide residue and other harmful chemicals-free crops. The challenges are how to produce these crops in ways that are environmentally friendly and without lowering the yield levels achieved by conventional production systems (Prabhakar *et al.*, 2012). Organic vegetables fetch a premium price of 10 to 50 per cent over conventional products (Sridhar *et al.*, 2014) making it attractive proposition for the selective farmers interested in this. Onion (*Allium cepa* L.) is one of the important commercial bulbous crops cultivated extensively in India covering an area of 1.203 million hectares with a production of 19.4 million tonnes and productivity of 16.10 tonnes per hectare.

In the present scenario, both the state and central Government is focusing on natural/ organic farming for achieving sustainable productivity, food security as well as food safety. Therefore, it is a need to find out the efficiency of natural and organic farming on crop productivity and soil health in onion crop. Keeping above facts in sight, the present experiment is planned.

5. Objectives

- : (1) To compare the effect of organic and natural farming on growth, yield and quality of onion
  - (2) To assess the effects of organic and natural farming on soil properties

#### 6. Investigators

	PI	Dr. P. K. Dubey, Assistant Professor, NRM, ACHF, Navsari Dr. A.R. Kaswala, Asso. Prof. & Head, NRM, ACHF, Navsari Dr. A.P. Italiya, Asstt. Res. Sci., SWMRU, Navsari Dr. R.B. Ardeshna, Assoc. Professor, NRM, ACH, Navsari		
	Co-PI			
	Associate			
7.	Location & Agro-cli region	<b>natic sub-</b> : Organic Farm Unit, ACH, NAU, Navsari South Gujarat Heavy Rainfall Zone (AES- III)		
8.	Year and season	: <i>Rabi</i> , 2024-25		
9.	Crop & variety	: Onion, Pilli patti		
10.	Experimental detail	<b>;</b>		
	(a) Treatments	: M <sub>1</sub> - Natural farming module		
		M <sub>2</sub> - Organic farming module (Low input)		
		M <sub>3</sub> – Control (100% N)		

2

3

# M<sub>1</sub> - Natural farming module

## **Onion nursery**

- i) Seed treatment with bijamrut i)@ 300 ml/kg seed
- ii) Application of 100 kg/500 m<sup>2</sup>
   Ghan-jivamrut will be done ii) before sowing
- iii) First spray of jivamrut after 7 days of germination and subsequent two sprays in an interval of 3-4 days after first spray (1lit jivamrut in 15 lit of water)
   Note: The spray of jivamrut

will be done in such a way that it fall on the ground while spraying

# Onion (TP)

- Application of ghan-jivamrut i)
   2 t/ha at transplanting and also add 2000 kg FYM/ha ii) and in succeeding year reduced 25% dose of FYM
- ii) Application of Jivamrut @ iii) Foliar 1250 lit/ha with each *Gliricic* irrigation formul
- iii) Foliar spray of Jivamrut at 21 DATP (12.5 lit jivamrut in 250 lit water/ha) and 42 DATP (50 lit jivamrut in 500 lit water/ha) + sour butter milk spray at 63 DATP (12.5 lit sour butter milk in 500 lit water/ha)

#### **Plant protection**

required

M<sub>2</sub> - Organic farming module

# Onion nursery

- Application of 500 kg/500 m<sup>2</sup> i) compost will be done before sowing
- Weekly spray of *Gliricidia* + papaya based formulation @ 2% after 10 DAS

# M<sub>3</sub> – Control

## Onion nursery

- Application of 1 ton/ 500 m<sup>2</sup> compost will be done before sowing
- ii) Weekly spray of *Gliricidia* + papaya based formulation @ 2% after 10 DAS

# Onion (TP)

RDN i) Application of 100% RDN though compost application of 2% Gliricidia + papaya based formulation, starting from 15 DATP at 15 davs interval upto 60 DATP

# Plant protection

Application of neemastra, Application of Bio-pesticides, botanicals etc. if brahmastra, agnistra, dasparni ark and sour butter milk if

(b)	Design	:	Large plot technique (CRD)
(c)	Replications	:	10 (10 samples area each of 3.6 m x 3.0 m with 3 beds of 90 cm)
(d)	Plot size	:	$30.0 \text{ m} \times 20.0 \text{ m}$
(e)	Spacing	:	15 cm x 10 cm
(f)	Seed rate (kg/ha)	:	8 kg
(g)	Manures & fertilizer	:	125 kg N/ha
(h)	Any other detail	:	-

# Onion (TP)

- Application of 50% R though compost
- Gliricidia + papaya based though formulation@ 1250 l/ha with ii) Foliar each irrigation applic
- Foliar application of 2% *Gliricidia* + papaya based formulation, starting from 15 DATP at 15 days interval upto 60 DATP

11. Observations to be recorded

## A. Growth and yield

- a. Plant height (cm)
- b. Bulb equatorial diameter (cm)
- c. Bulb polar diameter (cm)
- d. Bulb neck thickness (cm)
- e. Bulb yield (t/ha)

#### **B. Quality**

- a. TSS (%)
- b. Pyruvic acid (µmoles/g)

## C. Soil properties (Initial and final)

- a. Soil pH and EC
- b. Organic C
- c. Available N, P, K and S
- d. Total microbial population (cfu/g)

12. Methodology

:

:

-

1. Experiment number & title :

: 20.7.36

1

Variability of weather events and its impact on flowering, fruiting and yield in organic mango (*Mangifera indica* L.) cv. Kesar

- **2. Budget Head** : 12088
- 3. Collaborative department, if any

## 4. Back ground information:

Gujarat is one of the major mango growing states which has bought 1.63 lakh ha area and 1.21 MT production under mango (Anonymous, 2018). A large area is being brought under mango cultivation, which needs specialized backup for making Gujarat a strong mango growing state, for better income generation, employment opportunities and nutritional security.

Now a days Government target on organic cultivation and therefore it is important to know how the variability in weather events is affecting the flowering, fruiting and yield. Considering its importance this study has been proposed. The present investigation was aimed to study the effect of weather variable on flowering, fruiting and yield of organic mango cv. Kesar.

#### 5. Objective

- Comparing the daily weather data of 2024-25 with the long term past weather data to know the variation in weather variable
- To know the effect of weather parameters on flowering behavior, fruit setting and fruit drop in mango cv. Kesar
- To study the crop weather relationship of mango cv. Kesar

1

• To calculate meteorological indices for fruit maturity in organic mango cv. Kesar

#### 6. Principal investigator

	PI	Dr. Smita	Gupta, Asstt. Prof., ACH, NAU, Navsari
	armar, Asstt. Prof., NMCA, Navsari		
	Associates	Dr. Yatin Dr. A.R. k	Tandel, Associate Professor, ACH, NAU, Navsari (aswala , Assoc. Professor, ACH, Navsari
	Location and agro-o	climatic :	Organic Farm Unit, ACH, NAU, Navsari
	sub region		South Gujarat Heavy Rainfall Zone (AES-III)
7.	Year and season	:	2024-25
8.	Crop and variety	:	Mango (Organic) cv Kesar
9.	Experimental details	<b>s</b> :	
	Treatment Details	:	$T_1 : 1-15^{th}$ December-2024
			T <sub>2</sub> : 16-31 <sup>st</sup> December-2024
			T <sub>3</sub> : 1-15 <sup>th</sup> January-2025
			T₄ : 16-31 <sup>st</sup> January-2025
			$T_5$ : 1-15 <sup>th</sup> February-2025
			T <sub>6</sub> : 16-28 <sup>th</sup> February-2025
			T <sub>7</sub> : 1-15 <sup>th</sup> March-2025
	Design	:	Completely Randomized Design (CRD)
	No. of Replication	:	3
	No. of trees/treatme	nt :	8 (2 panicles in each direction)
	Planting Distance	:	6 m x 8 m
	Age of the tree		9 years old
	Observation to be recorded	:	
	: •	Flowering	parameters

**1.** Date of initiation of flowering

- **3.** Length of panicle (cm)
- Fruiting parameters
  - 1. Number of pea stage fruits per panicle
  - 2. Number of fruit/tree
  - 3. Yield (Kg/ha)

## • Weather parameters

- 1. Maximum & minimum temperature (°C)
- 2. Rainfall (mm)
- 3. Relative humidity (%)
- **4.** Wind velocity (km/hr)
- **5.** Bright sunshine hours (hrs/day)
- 6. Soil temperature (°C)

#### Methodology

- 1. Analysis of daily weather data will be done by using mean and coefficient of variation
- 2. Evaluation of Mango cv. Kesar for flowering behaviour, and fruiting behaviour in response to weather variable particularly maximum temperature, minimum temperature, rainfall and relative humidity by using correlation coefficient
- 3. For 3<sup>rd</sup> and 4<sup>th</sup> objective, crop weather relationship, heat unit like growing degree days (GDD), heliothermal unit (HTU) and photothermal unit (PTU) will be computed by using the methodology as described by Nuttonson (1955).