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ENGINEERING COLLEGE

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AGRICULTURE

DUPLICATE SEED IDENTIFICATION SOLUTIONS

Seed Germination Definition

Seed germination is a process where a seed germinates, i.e. develops and grows into new plants. The growth of an embryo from seed into seedling under favourable conditions is called seed germination. Seed germination can also be defined as a process in which different plant species grow from a single seed into a plant.

DUPLICATE SEED IDENTIFICATION SOLUTIONS

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INTRODUCTION

STAGES OF SEED GERMINATION :

The process of seed germination involves several consecutive but overlapping events like

- Absorption of water.
- Initiation of cell enlargement and division.
- Increased enzymatic activity.
- Food translocation to growing embryo.
- Increase in respiration and assimilation .
- Increase in cell division and enlargement .
- Differentiation of cells into tissue and organs of a seedling.

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INDEPENDENT WORK

Germination Problems :

- Perform a germination test if you believe seeds may be past their best.
- Starting tomatoes and peppers under a propagator lid increases humidity.
- Moldy potting soil is a sign of overly wet conditions.
- Tiny flies may be fungus gnats, whose larvae feed on plant roots.

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VISION & MISSION

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VISION

- "To promote sustainable and equitable agricultural practices that enhance food security, improve livelihoods, and preserve the natural environment."
- A system could be developed that assigns a unique identifier to each seed batch. This identifier would be used to track the batch throughout the production process, from planting to harvest
- Genetic testing could be done using techniques such as DNA fingerprinting, which can identify unique genetic markers in each seed.
- To identify duplicate seeds within a batch, a combination of physical and genetic testing could be used.

MISSION

- "To create a world where all communities have access to healthy and nutritious food, and where agriculture is practiced in a way that protects and enhances the natural resources upon which we all depend."
- Seed collections may be used for various purposes, such as agricultural research, plant breeding, or conservation efforts, and maintaining genetic diversity within the collection is crucial for its effectiveness.
- The ultimate goal is to ensure that farmers have access to high-quality, genetically diverse seeds that can help them grow healthy, productive crops.
- seed companies and plant breeders can also reduce the risk of inadvertently introducing unwanted traits or characteristics into their breeding programs or production fields.

CAUSE

SEED DUPLICATION CAUSES

1. Loss of income and wastage cost
2. Lack of single customer view
3. Lack of personalization
4. loss of productivity
5. Storage cost

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SOLUTIONS FOR SEED DUPLICATION

SEED TRAY

Use a seed tray with multiple compartments, and plant only one seed per compartment. This will make it easy to identify and remove any duplicates that appear.

SEEDLING HEAT MAT

Use a seedling heat mat to encourage faster germination and make it easier to identify and remove duplicates in a timely manner.

GRID PATTERN

Plant your seeds in a pattern, such as a grid, and mark the location of each seed with a label or marker. This will help you keep track of which seedlings belong to which seeds.

MONITORING

Monitor your seedlings closely and remove any duplicates as soon as you notice them. This will help prevent them from using up valuable resources, such as water and light, that could be better used by your other seedlings.

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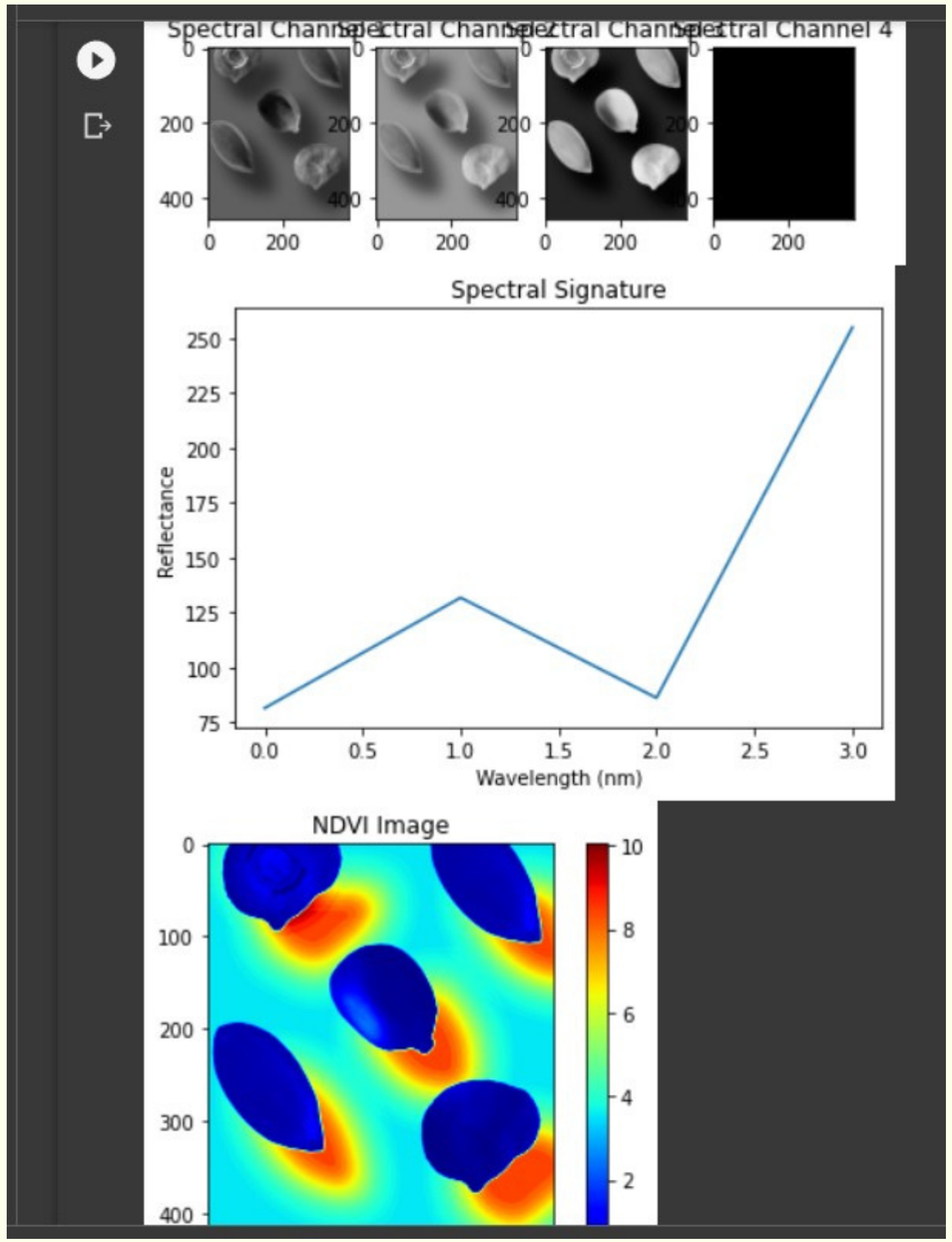
TECHNOLOGIES USED IN DUPLICATION SEED IDENTIFICATION

APPROACHES FOR DUPLICATION SEED IDENTIFICATION

- lot sensors
- Implementation by tiny AI
- Implementation in python using Deep learning technique (CNN alogrithm)

CODE

```
IMPORT CV2
IMPORT NUMPY AS NP
FROM MATPLOTLIB IMPORT PYPLOT AS PLT

# LOAD THE HYPERSPECTRAL IMAGE OF THE SEED
IMG = CV2.IMREAD('SEED_HSI.PNG', CV2.IMREAD_UNCHANGED)

# SPLIT THE IMAGE INTO ITS SPECTRAL CHANNELS
SPECTRAL_CHANNELS = CV2.SPLIT(IMG)

# DISPLAY THE SPECTRAL CHANNELS AS IMAGES
FOR I IN RANGE(LEN(SPECTRAL_CHANNELS)):
 PLT.SUBPLOT(1, LEN(SPECTRAL_CHANNELS), I+1)
 PLT.IMSHOW(SPECTRAL_CHANNELS[I], CMAP='GRAY')
 PLT.TITLE('SPECTRAL CHANNEL {}'.FORMAT(I+1))
PLT.SHOW()

# COMPUTE THE AVERAGE SPECTRAL SIGNATURE OF THE SEED
SPECTRAL_SIGNATURE = NP.MEAN(IMG, AXIS=(0,1))

# PLOT THE SPECTRAL SIGNATURE
PLT.PLOT(SPECTRAL_SIGNATURE)
PLT.TITLE('SPECTRAL SIGNATURE')
PLT.XLABEL('WAVELENGTH (NM)')
PLT.YLABEL('REFLECTANCE')
PLT.SHOW()

# COMPUTE THE NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI)
RED_CHANNEL = SPECTRAL_CHANNELS[2]
NIR_CHANNEL = SPECTRAL_CHANNELS[3]
NDVI = (NIR_CHANNEL - RED_CHANNEL) / (NIR_CHANNEL + RED_CHANNEL)

# DISPLAY THE NDVI IMAGE
PLT.IMSHOW(NDVI, CMAP='JET')
PLT.TITLE('NDVI IMAGE')
PLT.COLORBAR()
PLT.SHOW()
```



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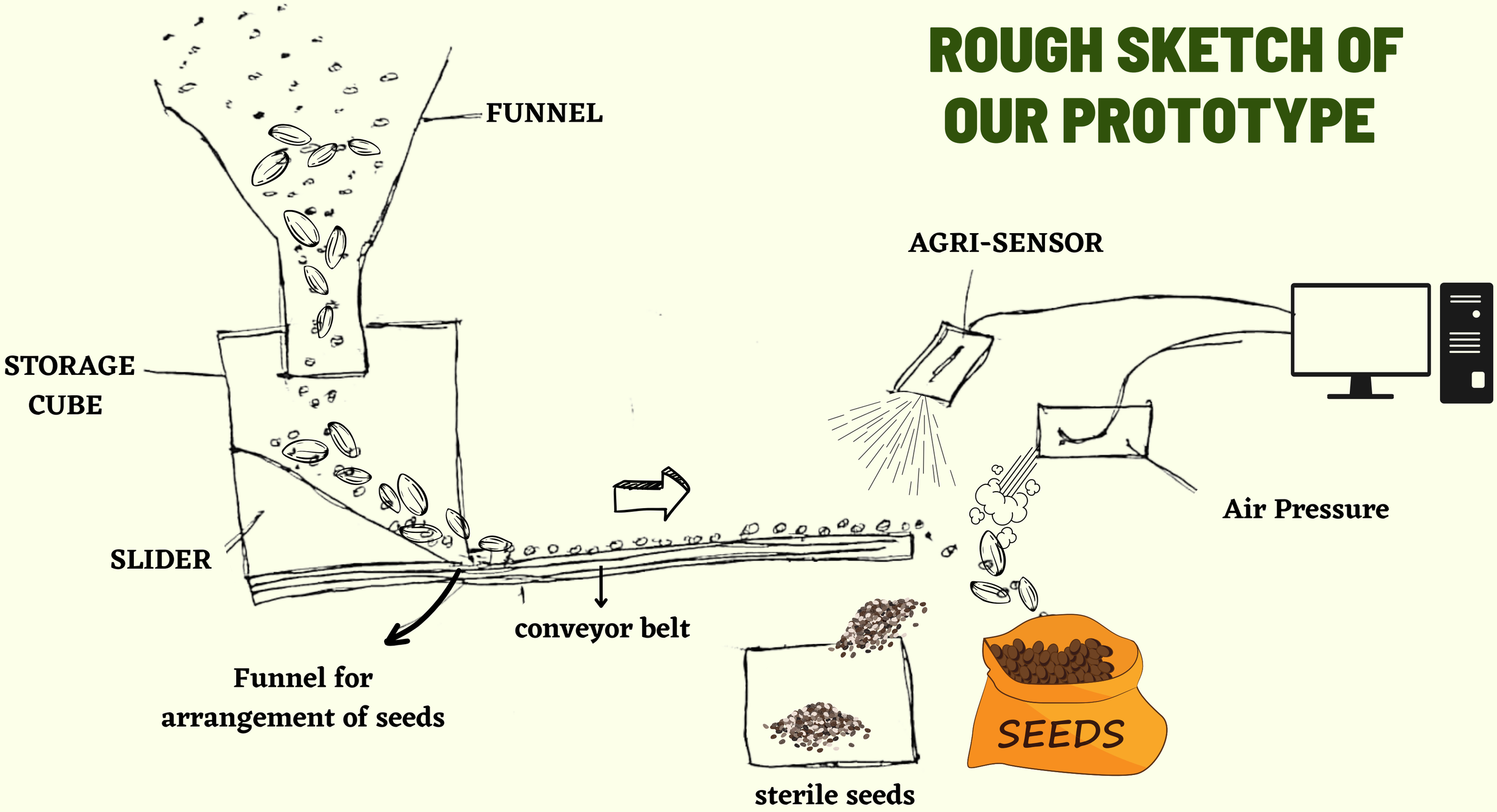
ADVANTAGES

- IT CLEANS THE SEED BY REVOLVING THE TRASH AND STONES PRESENT IN IT BY PRE-CLEANERS.
- IT GRADES THE SEED BY THE SHAPE, SIZE ETC. BY REMOVING THE SHRIVELLED AND DAMAGE SEED FROM IT.
- IMPLEMENTATION COST IS LESS.
- EASY TO USE EVERYONE IMPLEMENTATION IS VERY EASY.

ROUGH SKETCH OF OUR PROTOTYPE



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FUTURE PROJECT
MOBILE APP

Duplicate seeds identification by a mobile app refers to the process of using a mobile application to detect and flag instances of duplicated seeds in agriculture. Seeds that have been duplicated, either intentionally or unintentionally, can have negative impacts on crop yields and genetic diversity.

- A mobile app can help in identifying duplicate seeds by using various technologies such as image recognition, machine learning, and DNA sequencing. Farmers or researchers can use the app to take pictures of the seeds and upload them to the app, which then compares the images to a database of known seed varieties to identify any potential duplicates. The app can also use machine learning algorithms to analyze the seed characteristics and identify similarities and differences between different samples
- In addition, DNA sequencing can be used to identify duplicate seeds by analyzing the genetic code of the seeds. This process is more accurate but also more complex and expensive than using image recognition or machine learning.
- Overall, a mobile app for duplicate seed identification can be a valuable tool for farmers and researchers to ensure that they are using high-quality seeds and maintaining genetic diversity in their crops.m ipsum dolor sit amet, consectetur adipiscing elit. Nam in posuere risus, et euismod nisi. Morbi in tempor purus.

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ABOUT COMPANY

This company will be working on improving the agriculture seeds and equipment's it is implemented to help the farmers. The motto of an organization about AI in agriculture would typically reflect its core values and mission related to the use of AI in agriculture. Here is an example of a possible motto for such an organization:

"Transforming agriculture with cutting-edge technology and sustainable practices"

This motto highlights the organization's commitment to leveraging AI technology to drive positive change in the agriculture sector. It emphasizes the importance of using advanced technology in a way that is environmentally sustainable and socially responsible.

The phrase **"cutting-edge technology"** conveys a sense of innovation and leadership, while the phrase **"sustainable practices"** underscores the organization's commitment to long-term, responsible solutions. The word **"transforming"** suggests a bold vision for the future of agriculture, where technology and sustainability work hand-in-hand to improve the lives of farmers, consumers, and the planet as a whole.

Overall, the motto of an organization about AI in agriculture should communicate a clear and inspiring message about the organization's purpose and values, while also setting it apart from other players in the industry.

USE CASE

KILLING FIELDS OF TELANGANA

Farm Suicides Continue To Haunt The State With Crop Growers Steeped in Debt Killing Themselves Under Threat From Moneylenders

TOTAL SUICIDES IN TELANGANA
2015
988
2018 (Up to Sept)
266

FARMER SUICIDES

Constituency	2015	2018 (upto Sept)
Nalgonda	130	48
Siddipet	98	37
Warangal	130	36
Khammam	62	20
Adilabad	31	17
Vikarabad	67	15

Data: State Crime Records Bureau

BY MLA-WISE CONSTITUENCY
(from June 2014 to Sept 2018)

Constituency	No. of suicides	Sitting MLA
Gajwel	124	K Chandrasekhar Rao(TRS)
Huzurabad	101	V Satish Kumar(TRS)
Manthani	95	Putta Madhu(TRS)
Dubbak	87	S Rama Lingo Reddy(TRS)
Nakrekal	86	Vemula Veeresham(TRS)
Devarakonda	84	Ravindra Kumar Ramavath(CPI)

Data: Development Dialogue of Centre for Sustainable Agriculture

RETURN OF PINK BOLLWORM DESTROYED FARMER'S LIFE

The pink bollworm attack on BT cotton changed the destiny of Ch Vasanth Reddy's family. Reddy, who owned five acre in Kajarla, Talumadugu mandal, Adilabad district, hanged himself on May 22, 2018, in his house after after his bank loans mounted to 14 lakh. Debt continues to haunt Vasanth's family as it failed to get farmer suicide compensation as per Rythu Bima farmer life insurance scheme because he died in May and the scheme became operational from August this year. Though his family cleared part of a Adilabad District Central Cooperative Bank loan by selling a milch buffalo, their 10-tola gold ornaments mortgaged to Muthoot Finance were auctioned off after they failed to repay the gold loan, said Vasanth's widow Ch Kavita. "For two years 2016 and 2017, pink bollworm destroyed our cotton crop. We invested around Rs 20,000 per acre initially but got only two quintals per acre. The crop loan waiver didn't help. Despite the waiver, banks took the interest and we are still saddled with the debt," lamented Vasanth's father V Ashok Reddy

RYOT CONSUMES PESTICIDE OVER LOANS, WIDOW STILL AWAITS PENSION

Worried over the prospects of crop income and debts, farmer Amra Vittal of Jainad, one of the worst-hit areas in Adilabad, went into depression and consumed pesticide in his agricultural field in Guda village. The mandal is completely dependent on rains as borewells cannot be dug due to rocky terrain. The Pen Ganga irrigation project was delayed and Mission Kakatiya did not have much impact. The family claimed they did not receive any ex-gratia from the government after the incident. "Debt drove Vittal into depression and he killed himself on August 4. Revenue officials came home twice and noted down all the details, but no help has come in. I am not even getting widow pension," wailed Venkatamma, Vittal's widow.

IN THE VILLAGE OF JAWANS, 3 FAILED BOREWELLS PUSHED FARMER INTO HIS GRAVE

Ironic as it may seem but Mannur village, which has given 30 jawans to the country, is not able to protect its own 600 farming families in distress. One such distressed farmer Kaname Dhonderam ended his life by jumping into a neighbour's well after three borewells he dug at a cost of ₹60,000 to ₹80,000 each in 2016, after borrowing from private lenders at high rates, pushed him into debt and he was forced to abandon his cauliflower crop after prices plunged to less than Rs 10 per kg and the cost of protecting it from pests and harvesting was much higher. The Pill and panchanama of Gollathnoor police stated that Dondi Ram, who owned 8.5 acres in his and his mother's name, ended his life on October 5, 2018. His son, Kanami Som, a ninth class student of a local private school, said, "I am not going to take up cultivation. We have decided to give the land for tenancy. When I grow up, I will join the Indian Army."

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G.NIHAL REDDY

SON OF FARMER

K.BHUPATHI REDDY

SON OF FARMER

P.NIKHIL

SON OF FARMER

G.GOUTHAM RAJU

SON OF FARMER

K.ADHI KESHAVA

SON OF FARMER

Department of
Artificial Intelligence & Machine Learning

www.spechyd.ac.in

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THANK YOU

जय जवान जय किसान

JAI JAWAN JAI KISAN