

THE ONION TOONS

"A GRAPHIC TALE OF THE PERFECT HARVEST"



ICAR-Directorate of Onion and Garlic Research, Pune
भा.कृ.अनु.प. - प्याज एवं लहसुन अनुसंधान निदेशालय, पुणे

The Onion Toons

A graphic tale of the perfect harvest

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The cartoon characters, illustrations, and visual representations are AI-generated. These images are intended solely for educational, scientific communication, and outreach purposes. The scientific concepts and cultivation practices depicted are based on available agricultural knowledge.

Foreword

The successful dissemination of agricultural technologies depends not only on scientific innovation but also on the ability to communicate knowledge in a simple, engaging, and understandable manner. In the case of onion, a crop of immense economic and nutritional importance, farmers and stakeholders require timely access to information on improved production practices, disease and pest management, post-harvest handling, processing, value addition, and market opportunities.



I am delighted to present “The Onion Toons”, a unique compilation of comic-based stories developed to convey scientific and technical information through an innovative and reader-friendly format. By combining visual storytelling with practical lessons, this publication transforms complex agricultural concepts into easy-to-understand narratives that can be appreciated by farmers, students, extension workers, entrepreneurs, and the general public alike.

The stories featured in this book cover diverse aspects of the onion value chain, ranging from crop production and protection to post-harvest management, agribusiness development, and technology transfer. Each comic has been carefully designed to educate while entertaining, thereby enhancing knowledge retention and encouraging the adoption of improved technologies and best practices.

This initiative reflects the commitment of the ICAR-Directorate of Onion and Garlic Research (ICAR-DOGR), Pune, to strengthen technology dissemination through innovative extension approaches. I commend the efforts of the editorial team who have worked together to transform scientific information into an engaging learning resource.

I am confident that “The Onion Toons” will inspire curiosity, promote learning, and serve as a valuable educational tool for all stakeholders associated with the onion sector. I congratulate the authors and editors for this commendable effort and wish this publication wide readership and success.



(Dr. Vijay Mahajan)

Director

**ICAR-Directorate of Onion and Garlic Research,
Pune, Maharashtra**

Preface

Effective communication of scientific knowledge to farming communities remains one of the most important pillars of agricultural development. While technological innovations continue to emerge, translating these innovations into farmer-friendly and easily understandable formats is equally essential. In this context, “The Onion Toons - a graphic tale of the perfect harvest” has been developed as an innovative extension communication initiative.

“The Onion Toons” represents a dynamic comic extension approach that merges engaging visual storytelling with agricultural education with illustrated stories inspired by real-life situations encountered by onion growers. Through sequential panels and colourful illustrations, it transforms complex farming concepts into accessible, bite-sized lessons, making agricultural topics fun and digestible for readers of all ages.

The stories included in this publication cover important dimensions of onion cultivation such as improved varieties, nursery management, balanced nutrient application, integrated pest and disease management, water-use efficiency, post-harvest handling, storage practices, market-oriented decision making. By presenting these concepts through comics, the publication aims to improve understanding, stimulate discussion, and encourage adoption among farmers, extension personnel, students, and rural youth.

We believe that knowledge communicated through creativity has greater potential to inspire change. The Onion Toons is therefore envisioned not only as an educational resource but also as a tool for participatory learning and agricultural transformation. Through visual storytelling, The Onion Toons aims to strengthen agricultural extension efforts, promote technology adoption, and inspire informed decision-making among farmers for sustainable and profitable agriculture.

We acknowledge the contributions of scientists, extension professionals, artists, and farming communities whose experiences and insights have shaped this publication. It is hoped that this publication will serve as a valuable companion in empowering onion growers with knowledge, confidence, and practical solutions for sustainable and profitable onion production.



(Rajiv B Kale)



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A COMIC GUIDE TO SMART ONION FARMING

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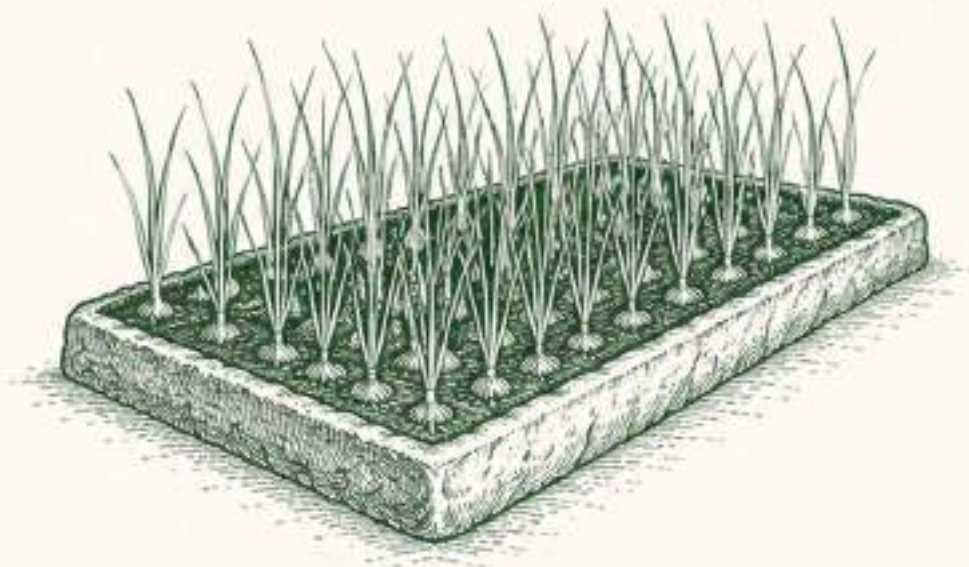
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STORY 1

The Beginning of a Healthy Crop



Nursery Management

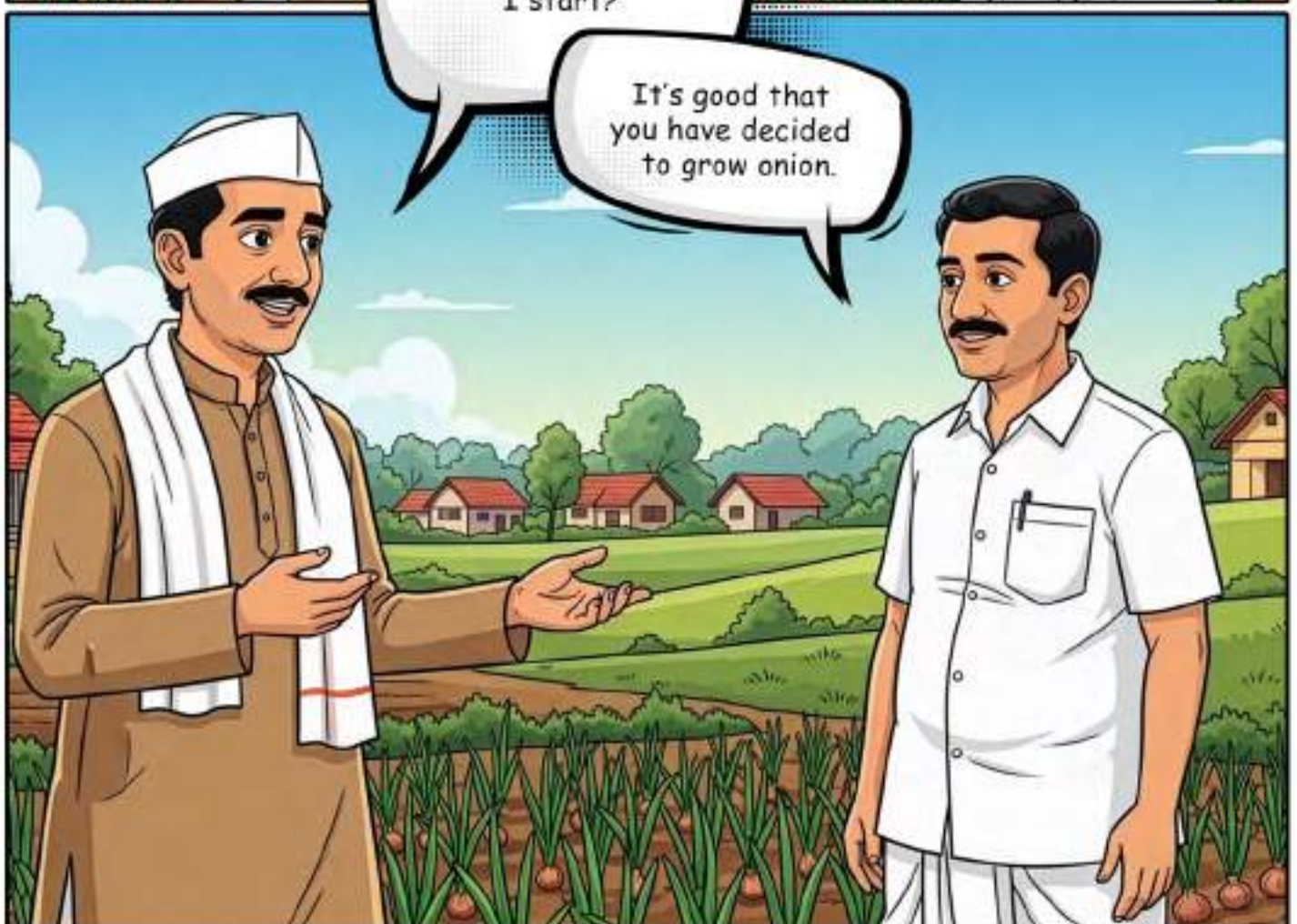
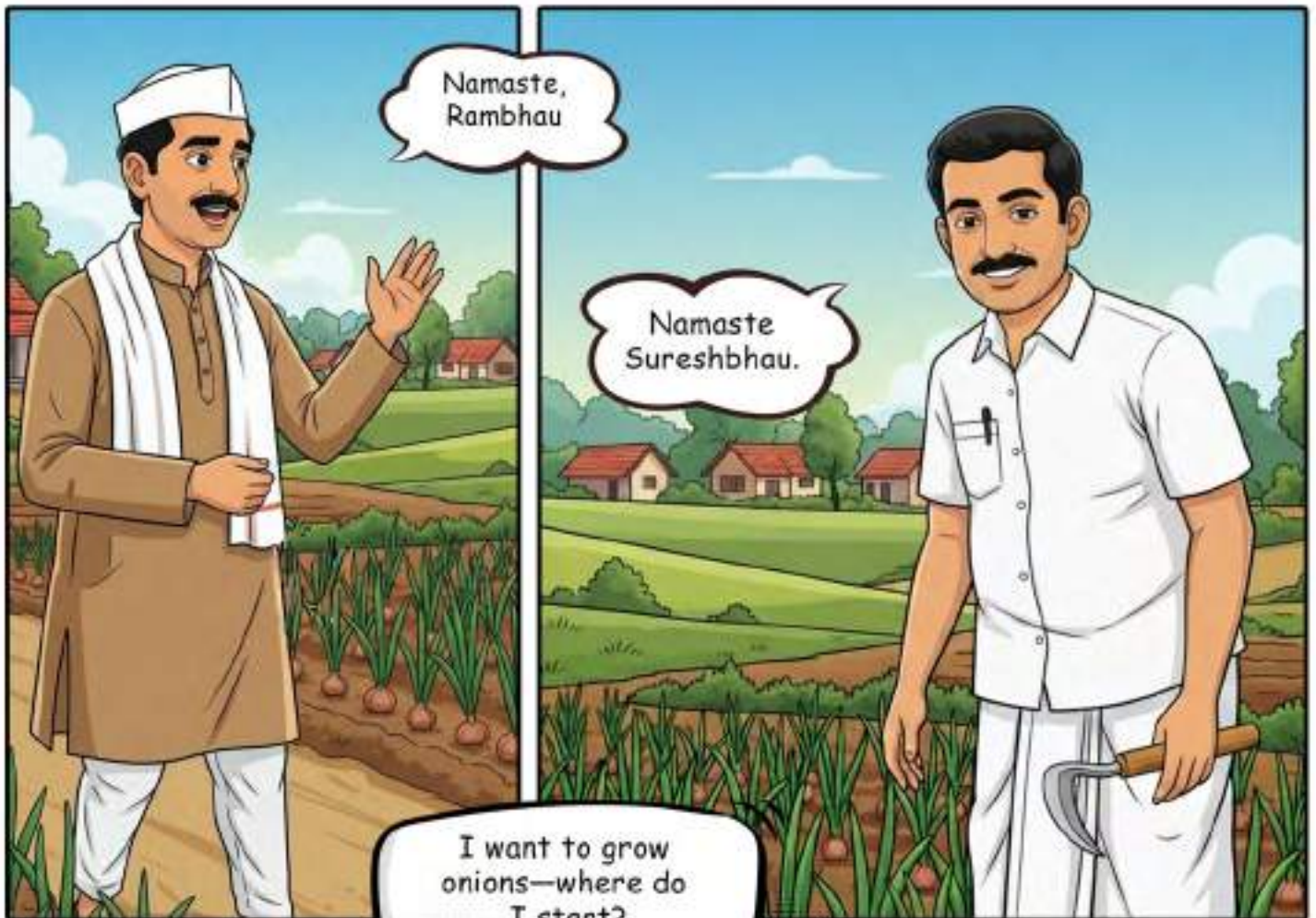


A new day begins... and with it, the first step
of a new farming journey also begins.

I want to grow
onion this season, but
I have never cultivated
onion before. From where
should I begin? Seed,
field preparation... or
nursery?

With a new season ahead,
questions begin to arise.

Rambhau has
grown onions for years
he'll guide me. I'll learn
from him and avoid
mistakes.







Dr. Gadge- Prepare fine, well tilled soil with harrowing for better cultivation.



Use Broad Bed Furrow method Prepare beds with 1 meter width and 34-40 meter length.



Dr. Gadge - Maintain 30-45 cm spacing between beds for proper drainage and uniform water flow. Avoid flat beds in heavy soils or rainy conditions, as they lead to waterlogging and disease incidence.



About 7-8 kg of good quality seed with more than 70% germination is sufficient for one hectare area.



Dr. Gadge - Before sowing, treat seeds with Thiram or carbendizium @ 2-3 gm/kg to protect against fungal diseases



After treatment dry the seeds in shade



Always do seed treatment to reduce the infestation of damping off disease



Sow the seeds at about 1 cm depth, in lines spaced 5 to 7.5 cm apart. Line sowing makes weeding easier, and proper plant protection.



After sowing, cover the seeds lightly with fine compost or powdered farmyard manure with trichoderma and mix thoroughly with the soil.



Give light irrigation immediately after sowing. Using drip or micro-sprinkler irrigation helps save water. Irrigate the nursery daily or twice a day, depending on soil type, to keep the top 2.5 cm soil moist.



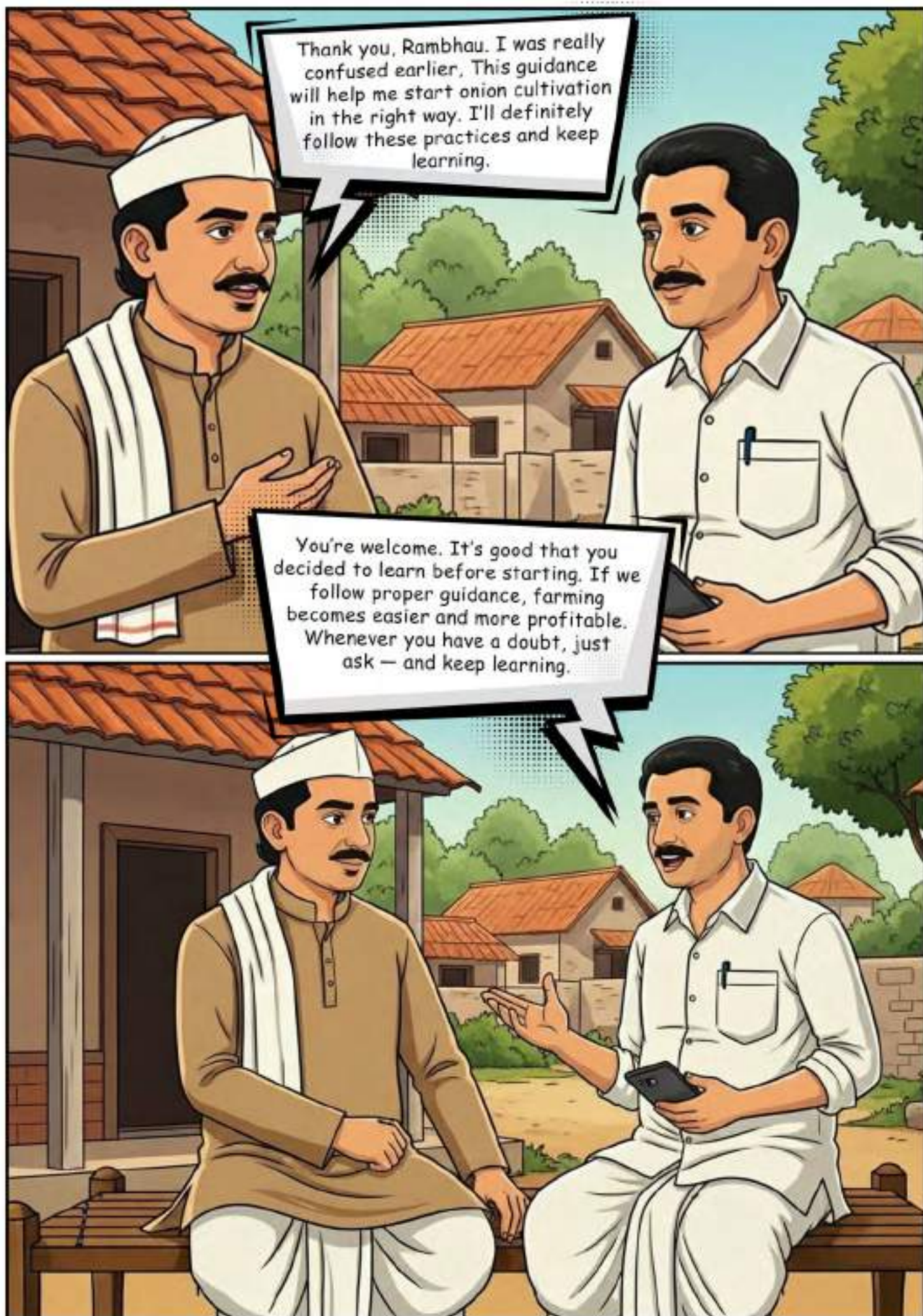
After irrigation, soil application of pre-emergence herbicide, pendimethalin @ 30%EC (3.5-4 ml/L) or Oxyfluorfen @23.5% EC (1.5-2 ml/L) is recommended to control weeds.

In case of flood irrigation, pendimethalin weedicide is needed to applied immediately after sowing.

भाकअनप-कांदा व लसुण संशोधन संचालनालय-पुणे

Depending on soil type, irrigate the nursery daily or twice a day, to keep the top 2.5 cm soil moist. To control soil-borne diseases, foliar spray of Metalaxyl at 0.2% and if thrips infestation is severe, spray Fipronil at 0.1% is recommended.

Seedlings become ready for transplanting in 40-45 days during Kharif season. For late Kharif and Rabi, seedlings are ready in 50-55 days after sowing.

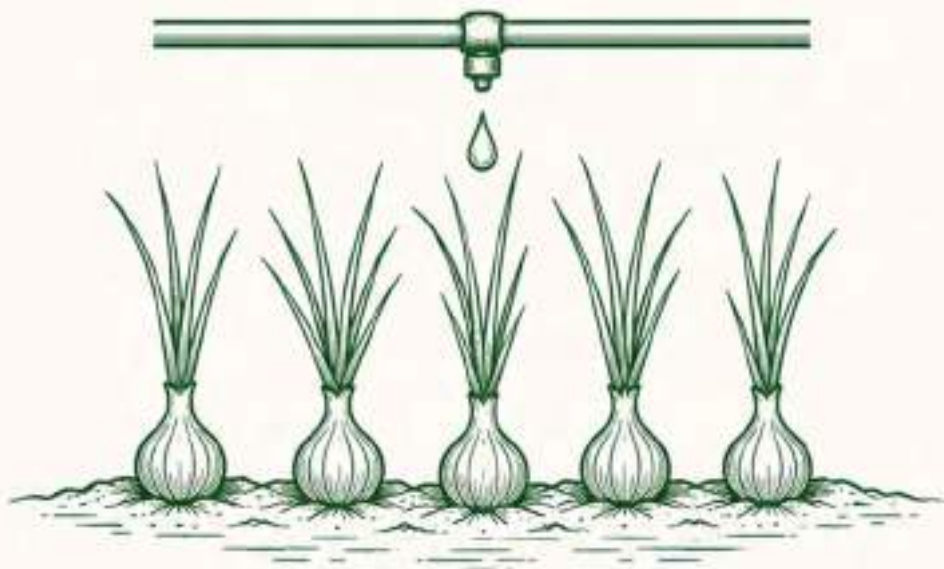


STORY 2

Watering for Better Growth



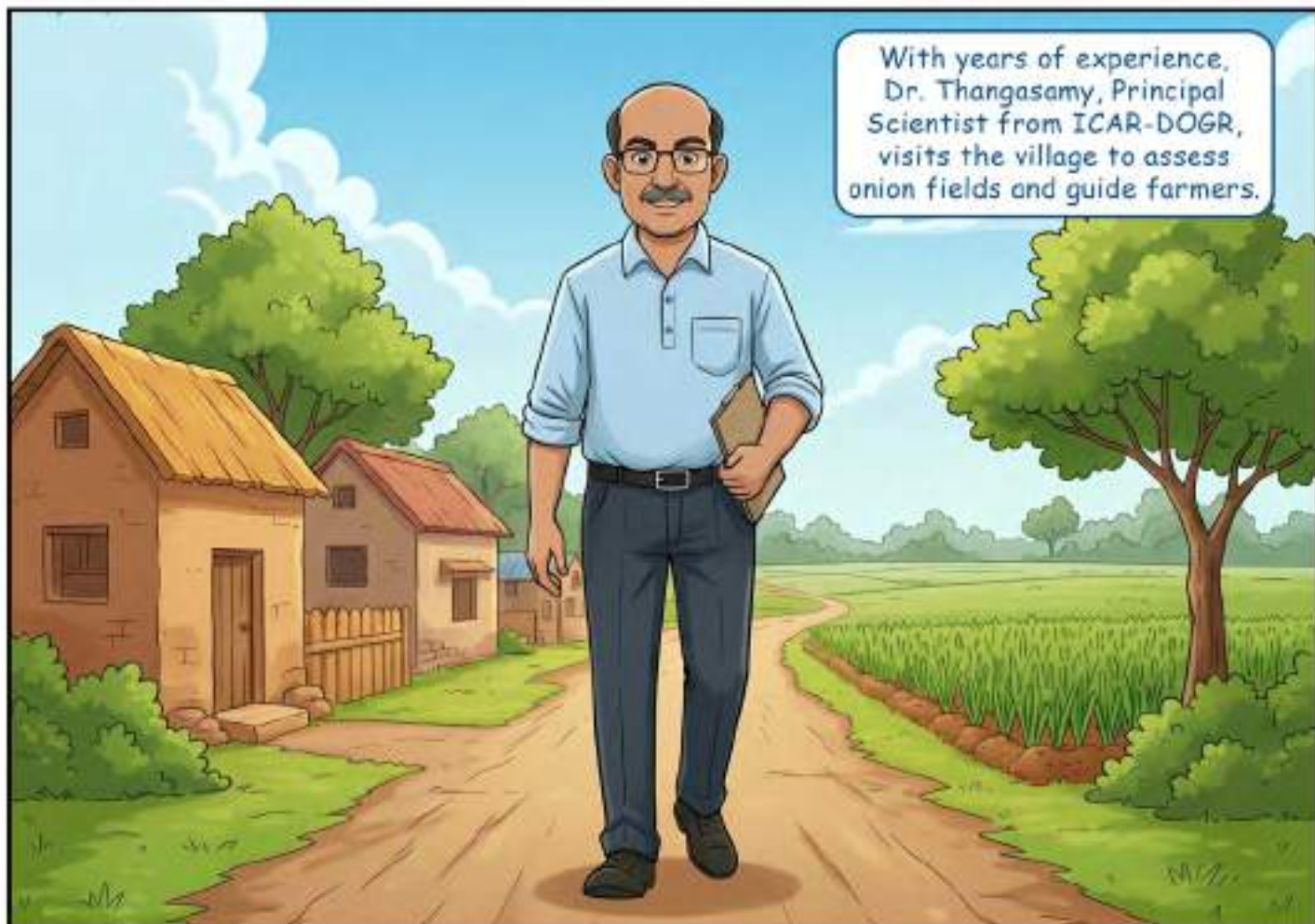
Irrigation Management



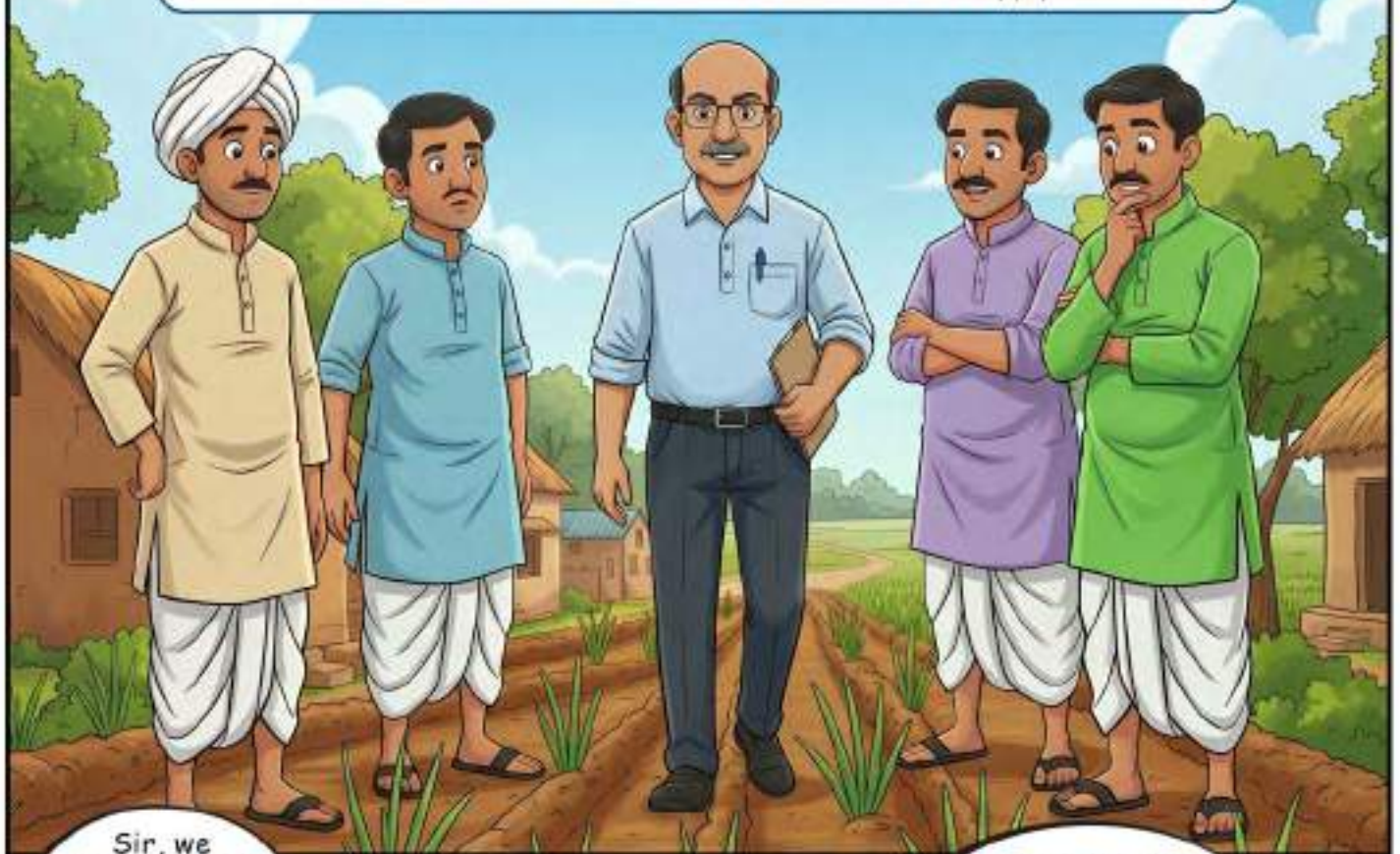
Early morning in the village—farmers inspect onion fields; some satisfied, others concerned.



With years of experience, Dr. Thangasamy, Principal Scientist from ICAR-DOGR, visits the village to assess onion fields and guide farmers.

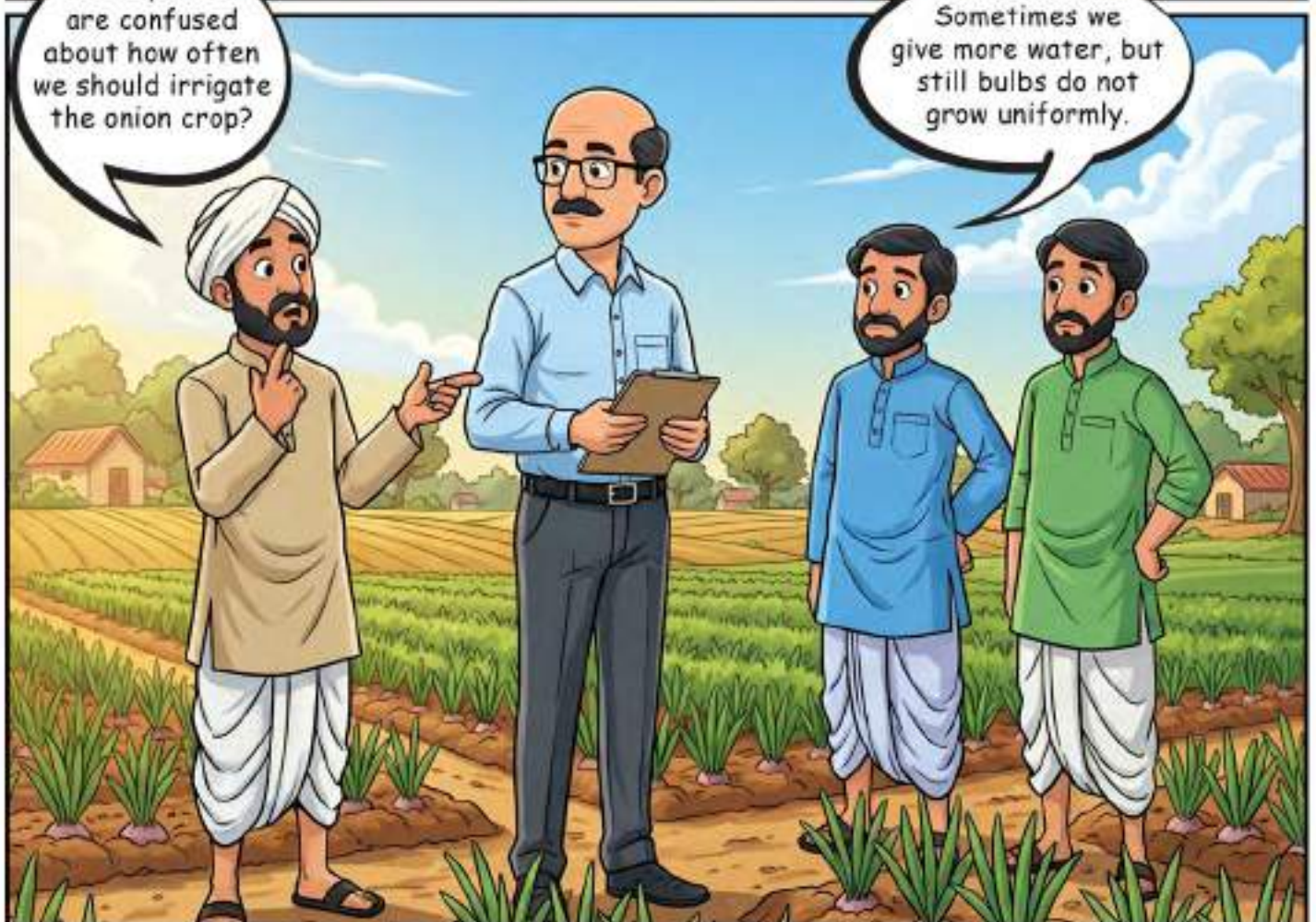


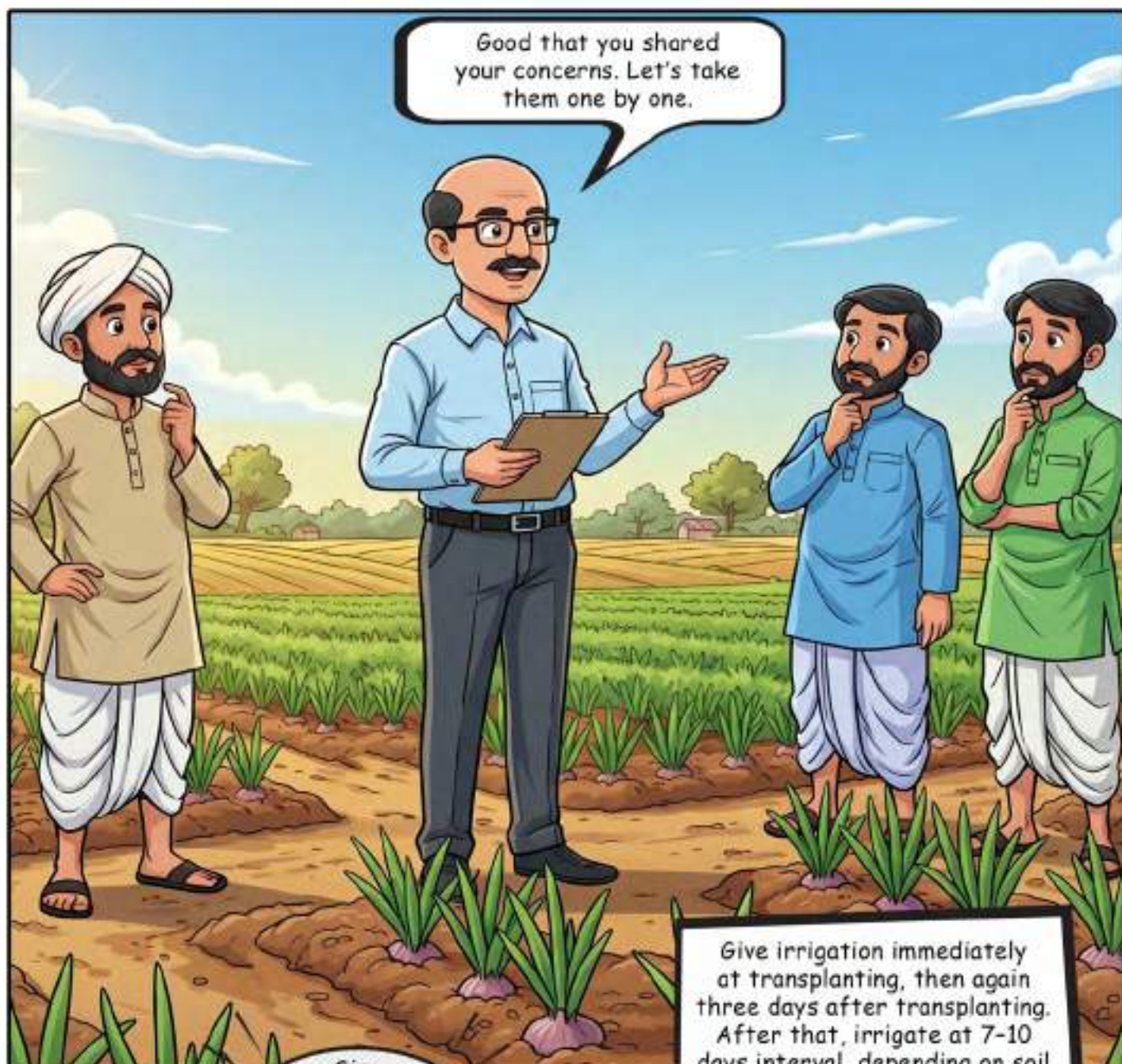
The farmers gather around the scientist and share their concerns about irrigation management in the onion crop, explaining their confusion about when and how much water to apply.



Sir, we are confused about how often we should irrigate the onion crop?

Sometimes we give more water, but still bulbs do not grow uniformly.

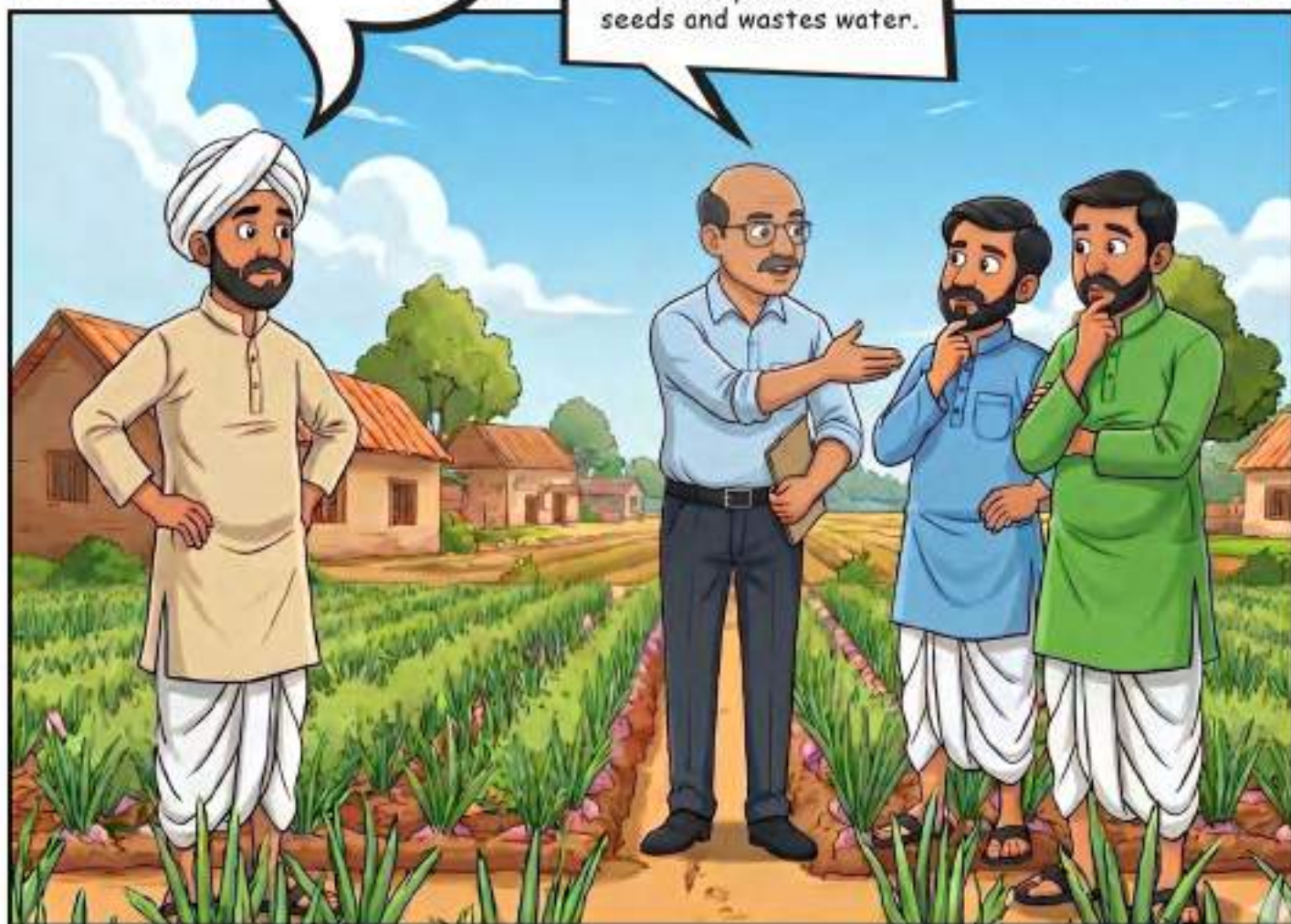


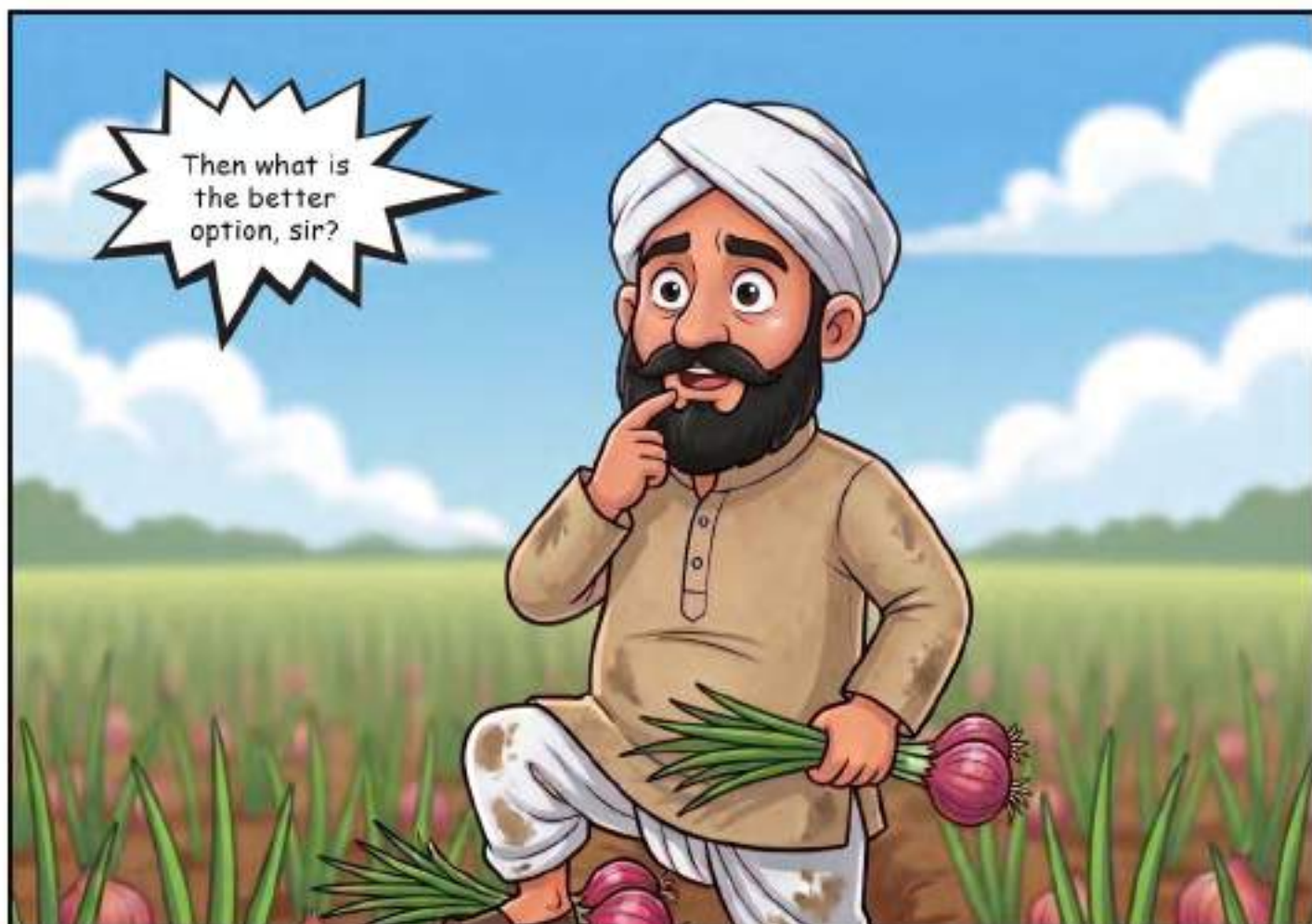


Dr. Thangasamy: Kharif onion needs less irrigation due to rainfall.
On average—Kharif: 5-8, Late kharif: 10-12, and Rabi: 13-15 irrigations. Onion is shallow-rooted, so frequent light irrigation is needed for proper bulb development.

We mostly use flood irrigation. Is it okay?

Flood irrigation causes high water loss due to seepage and percolation. It also spreads weed seeds and wastes water.



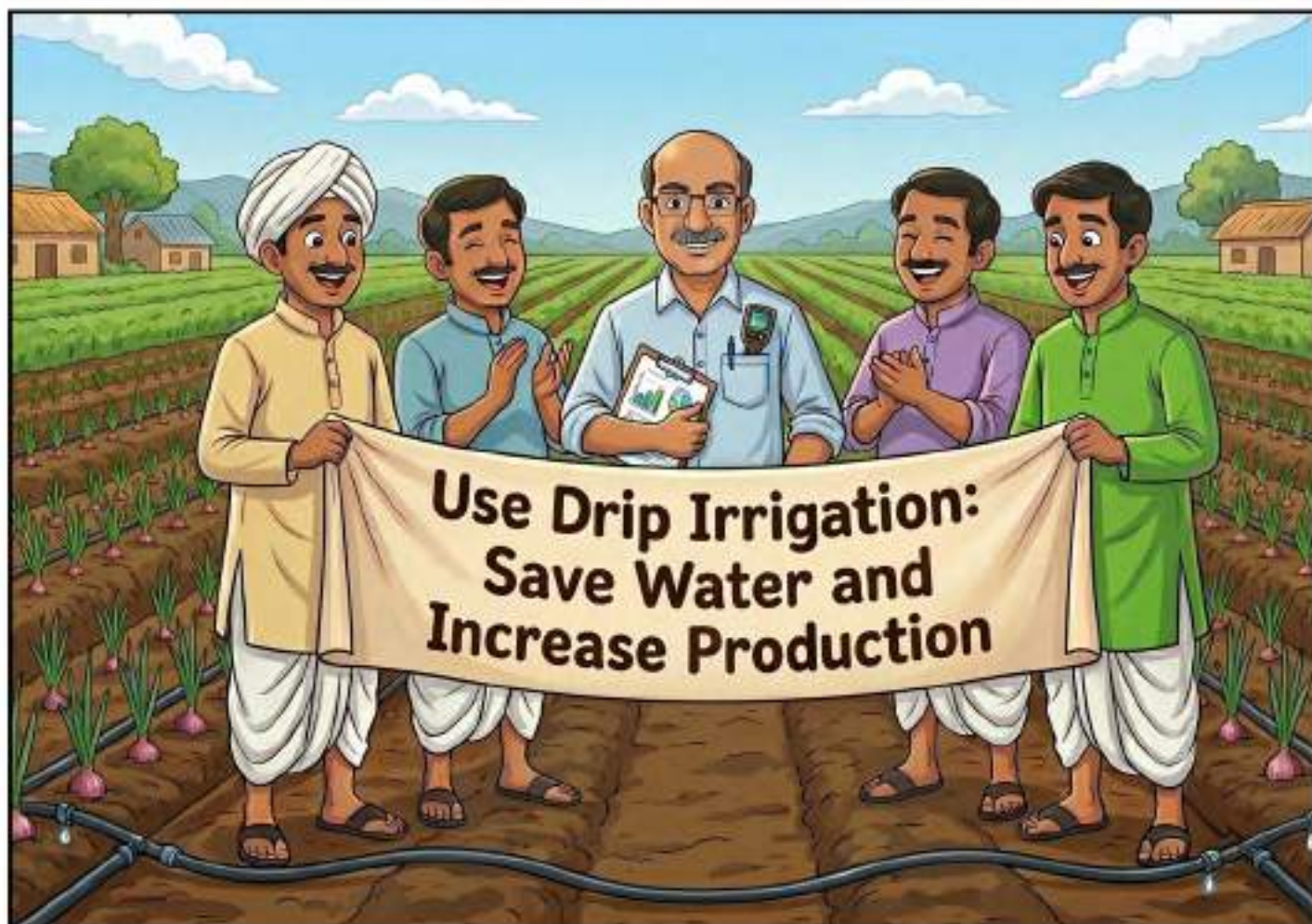




Dr. Thangasamy - Transplant seedlings at 10×15 cm spacing on Broad Bed Furrow (BBF). Each bed should have two drip laterals, with emitters placed 30-50 cm apart.





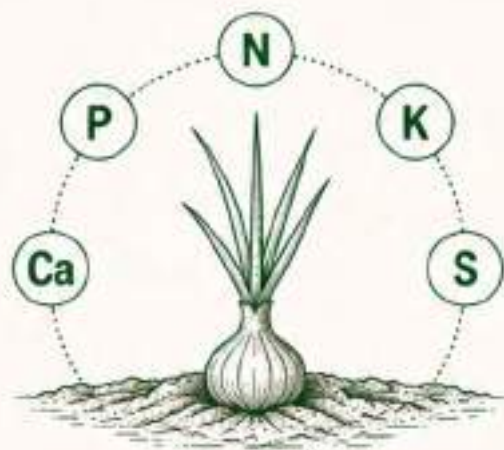


• **STORY 3** •

Food for My Onions

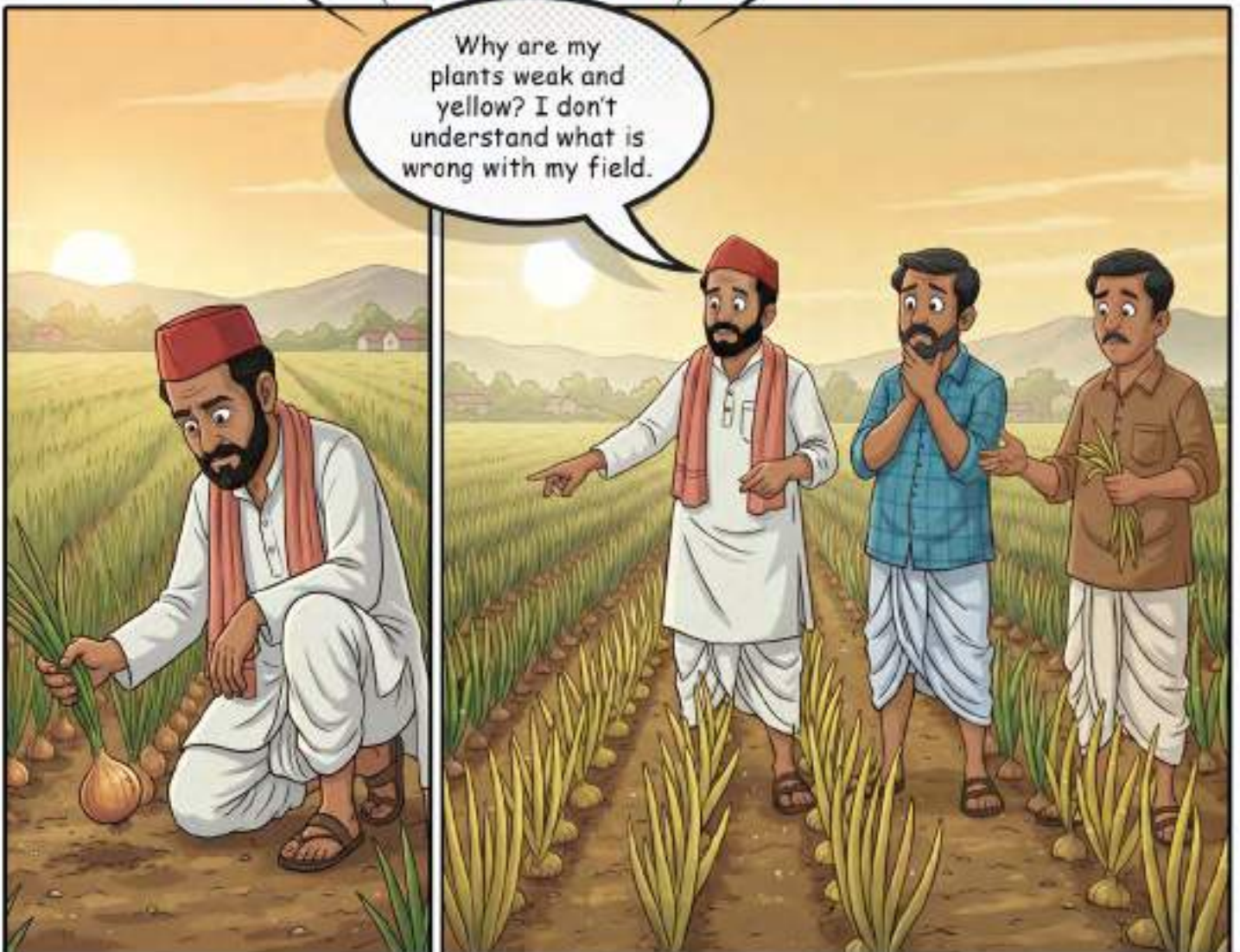


Integrated Nutrient Management

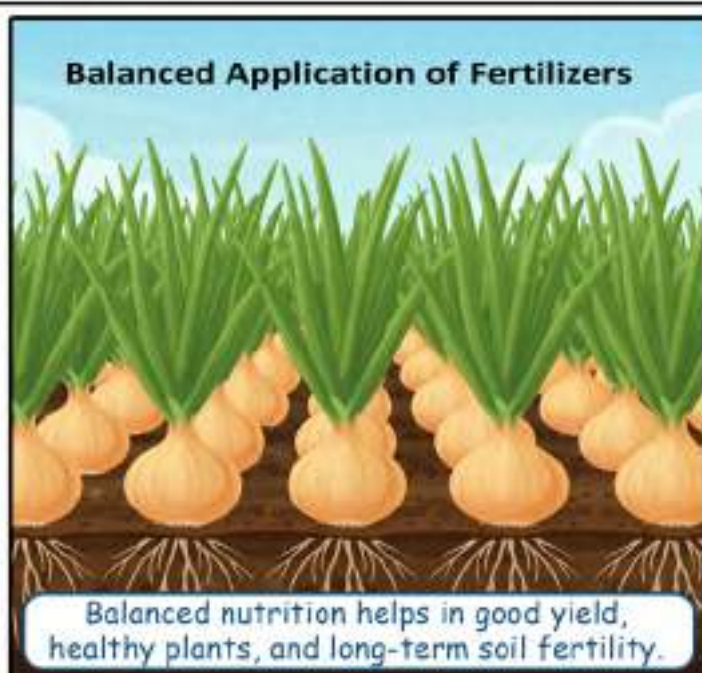
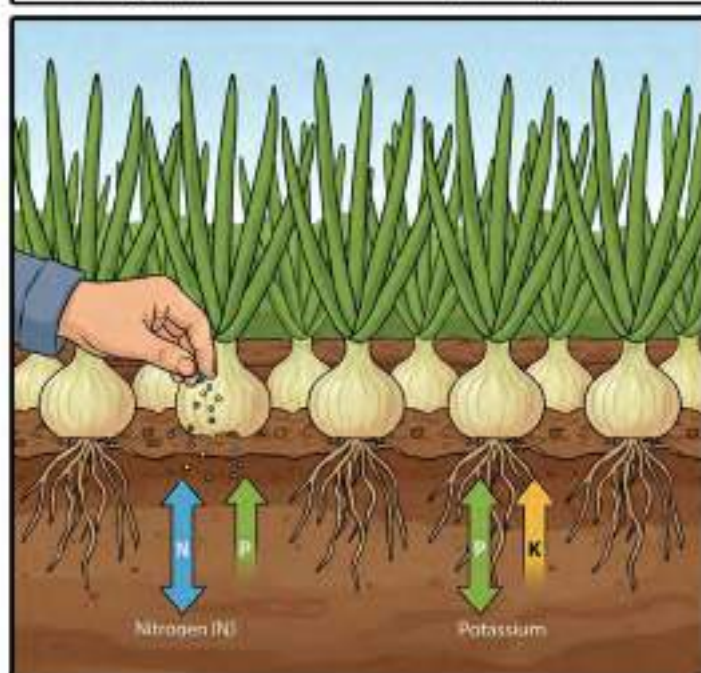
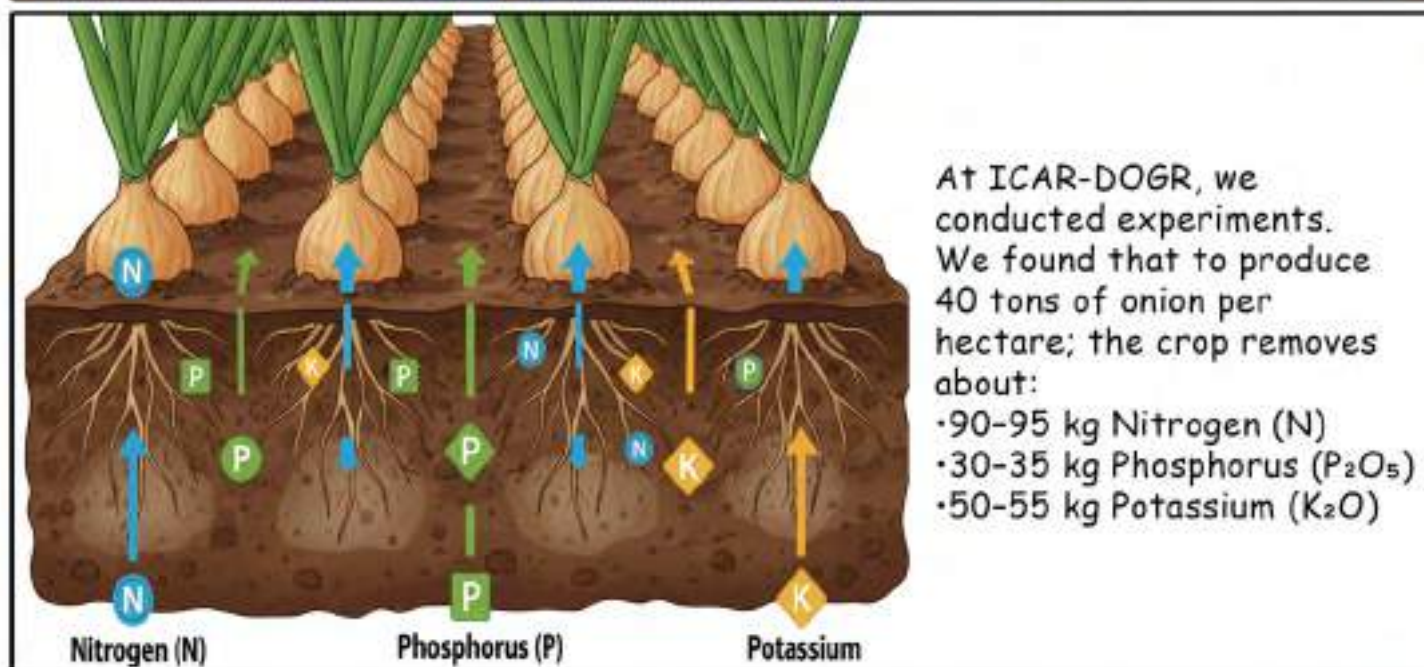




The sun rises over the onion fields. Golden light spreads everywhere. Tiny dew drops shine on the green leaves. A new day begins on the farm.



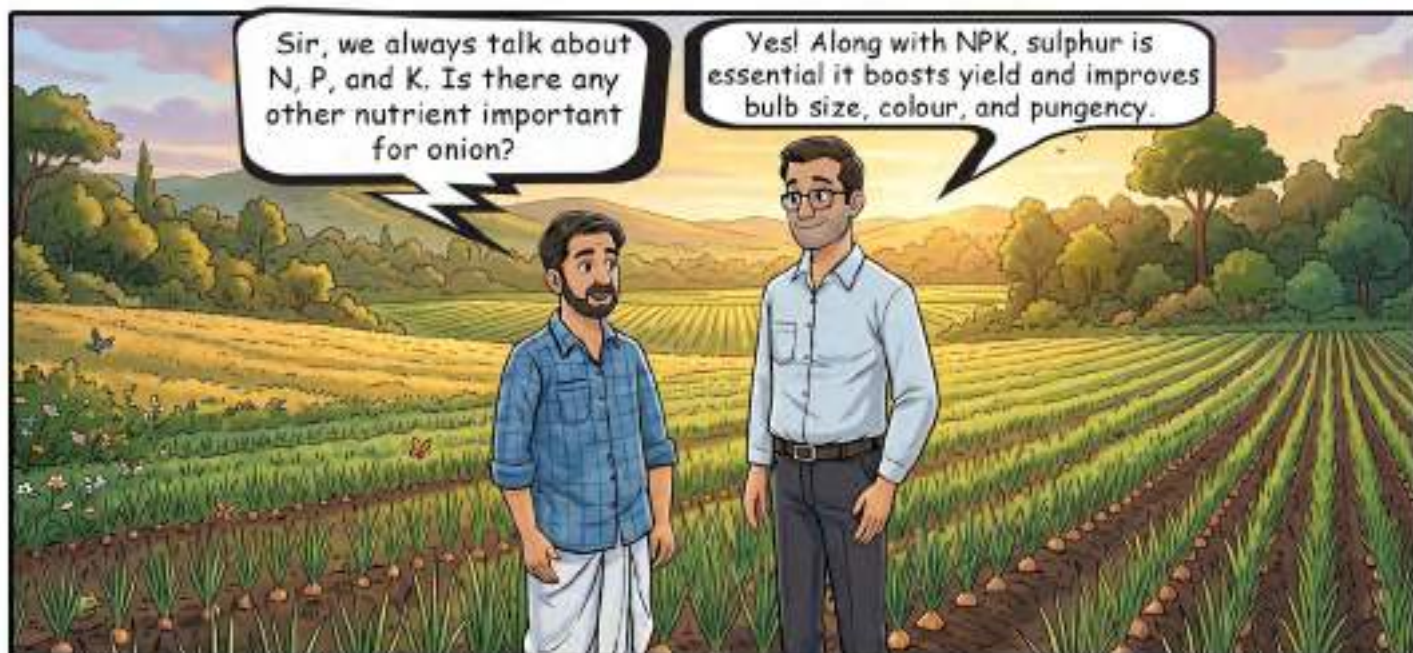




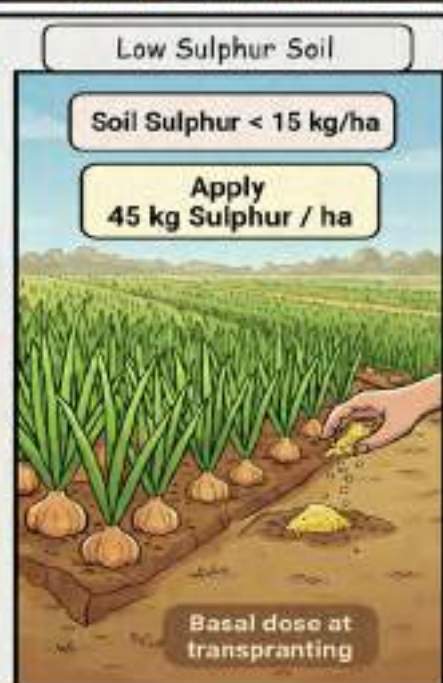
Dr. Kale: Based on many field experiments at ICAR-DOGR, we have fixed proper doses of organic manure and fertilizers. These are given in our recommendation table.

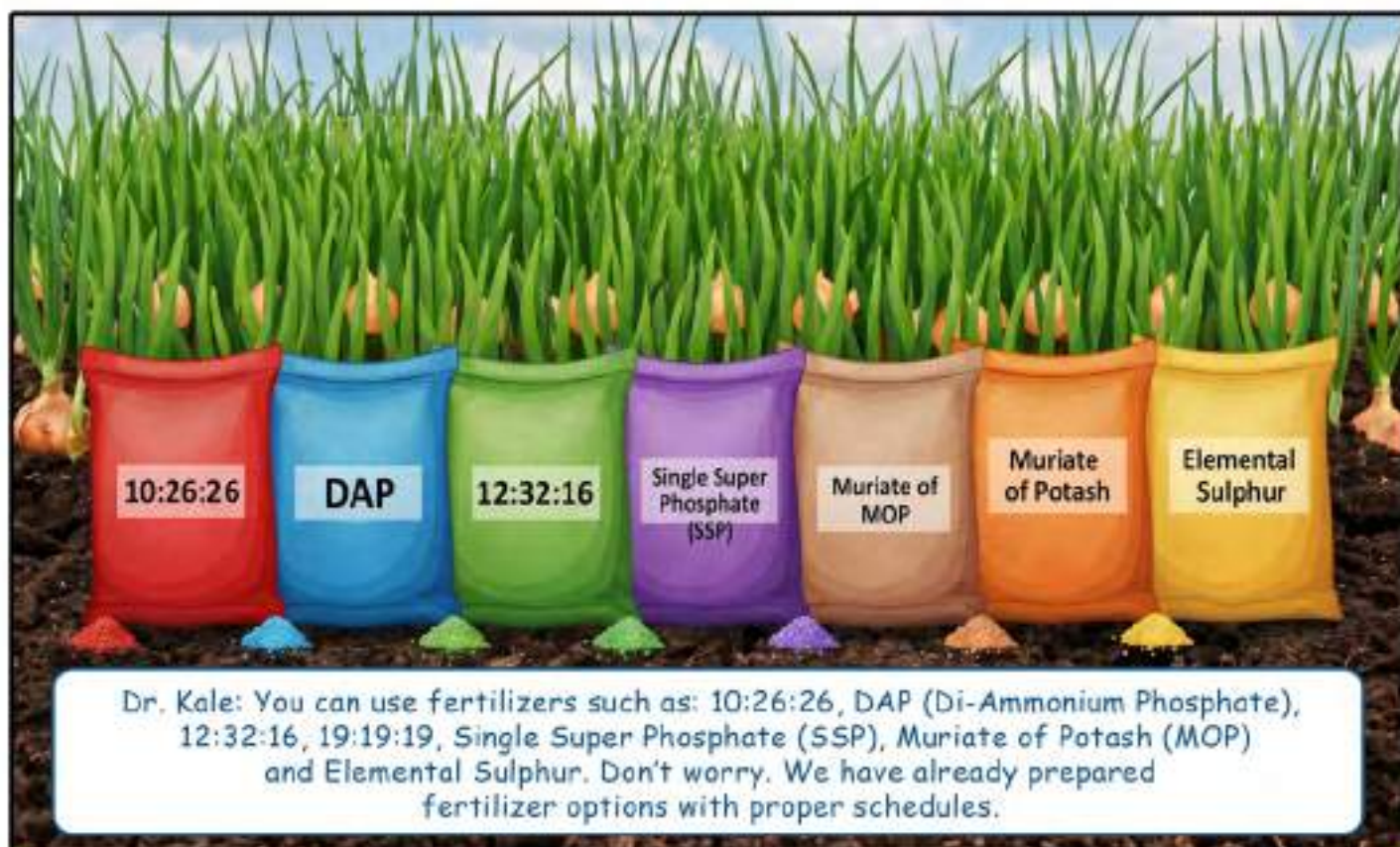
F o r K h a r i f O n i o n	Schedule	N	P ₂ O ₅	K ₂ O	Organic manures
	Kharif Onion (Yield potential – 25–30 t/ha)				
	Basal	20 kg	50 kg	50 kg	Organic manures equivalent to 50 kg N (FYM compost- Approx. 5 t/ha or Poultry manure- Approx. 5 t/ha or Vermicompost- Approx. 5 t/ha)
	15 DAT	26.7 kg	-	-	
	30 DAT	26.7 kg	-	-	
	45 DAT	26.7 kg	-	-	
	Total	100 kg	50 kg	50 kg	

F o r L a t e K h a r i f & R a b i O n i o n	Schedule	N	P ₂ O ₅	K ₂ O	Organic manures
	Late Kharif and Rabi Season (Yield Potential : 40–50 t/ha)				
	Basal	20 kg	40 kg	60 kg	Organic manures equivalent to 50 kg N (FYM compost- Approx. 5 t/ha or Poultry manure- Approx. 5 t/ha or Vermicompost- Approx. 5 t/ha)
	15 DAT	30 kg	-	-	
	30 DAT	30 kg	-	-	
	45 DAT	30 kg	-	-	
	Total	110 kg	40 kg	60 kg	



- If soil sulphur is above 15 kg/ha, apply 30 kg/ha.
- If below 15 kg/ha, apply 45 kg/ha.
- Always apply sulphur as a basal dose at transplanting.



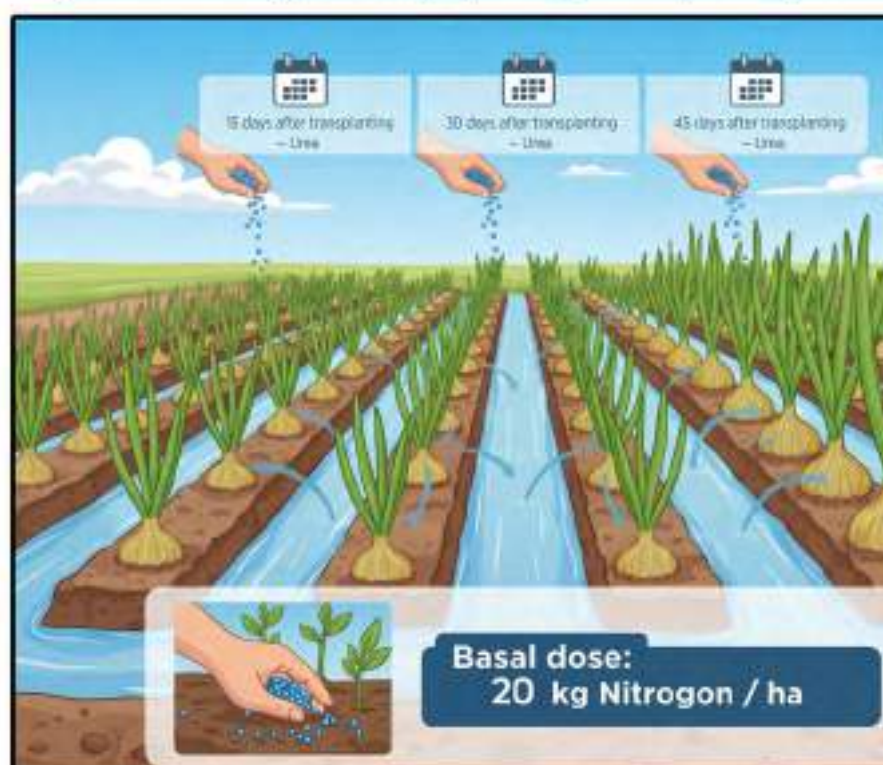


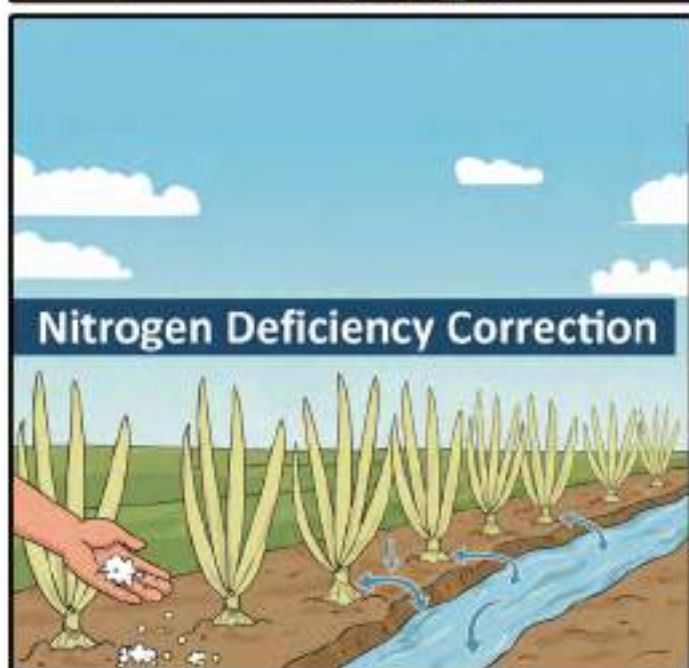
Fertilizer option	Fertilizers	Basal	Top dressing (Day after transplanting)		
			15	30	45
1.	10:26:26	192 kg/ha	-	-	-
	Bentonite Sulphur	33 kg/ha	-	-	-
	Urea	-	60 kg/ha	60 kg/ha	60 kg/ha
OR					
2.	DAP	110 kg/ha	-	-	-
	MOP	84 kg/ha	-	-	-
	Bentonite Sulphur	33 kg/ha	-	-	-
	Urea	-	60 kg/ha	60 kg/ha	60 kg/ha
OR					
3.	12:32:16	156 kg/ha	-	-	-
	MOP	25 kg/ha	-	-	-
	Bentonite Sulphur	33 kg/ha	-	-	-
	Urea	-	60 kg/ha	60 kg/ha	60 kg/ha
OR					
4.	19:19:19	100 kg/ha	-	-	-
	SSP	200 kg/ha	-	-	-
	MOP	50 kg/ha	-	-	-
	Bentonite Sulphur	10 kg/ha	-	-	-
	Urea	-	60 kg/ha	60 kg/ha	60 kg/ha

Fertilizer options for late kharif and rabi seasons

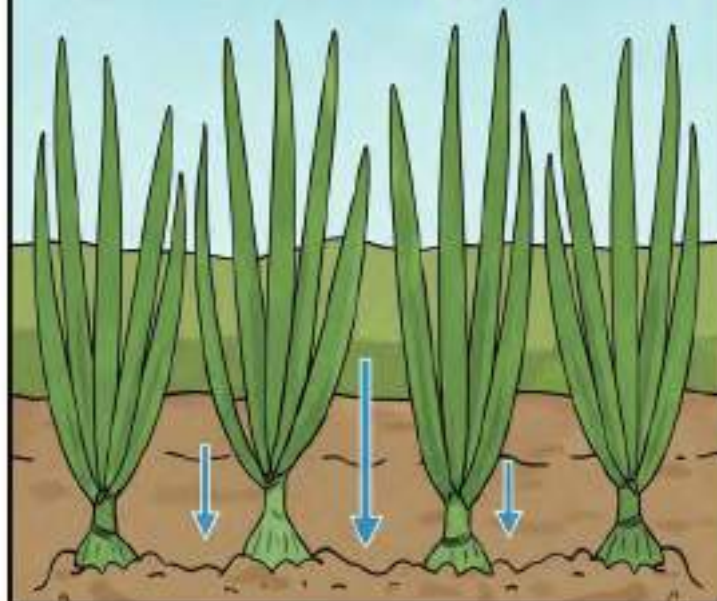
Fertilizer option	Fertilizers	Basal	Top dressing (Day after transplanting)		
			15	30	45
1.	10:26:26	160 kg/ha	-	-	-
	MOP	33 kg/ha	-	-	-
	Elemental Sulphur	33 kg/ha	-	-	-
	Urea	-	68 kg/ha	68 kg/ha	68 kg/ha
2.	DAP	87 kg/ha	-	-	-
	MOP	100 kg/ha	-	-	-
	Elemental Sulphur	33 kg/ha	-	-	-
	Urea	-	68 kg/ha	68 kg/ha	68 kg/ha
3.	12:32:16	125 kg/ha	-	-	-
	MOP	67 kg/ha	-	-	-
	Elemental Sulphur	33 kg/ha	-	-	-
	Urea	-	69 kg/ha	70 kg/ha	69 kg/ha
OR					
4.	19:19:19	100 kg/ha	-	-	-
	SSP	125 kg/ha	-	-	-
	MOP	67 kg/ha	-	-	-
	Elemental Sulphur	18 kg/ha	-	-	-
	Urea	-	65 kg/ha	65 kg/ha	65 kg/ha

In flood irrigation, apply nitrogen in splits—give about 20 kg/ha as a basal dose.

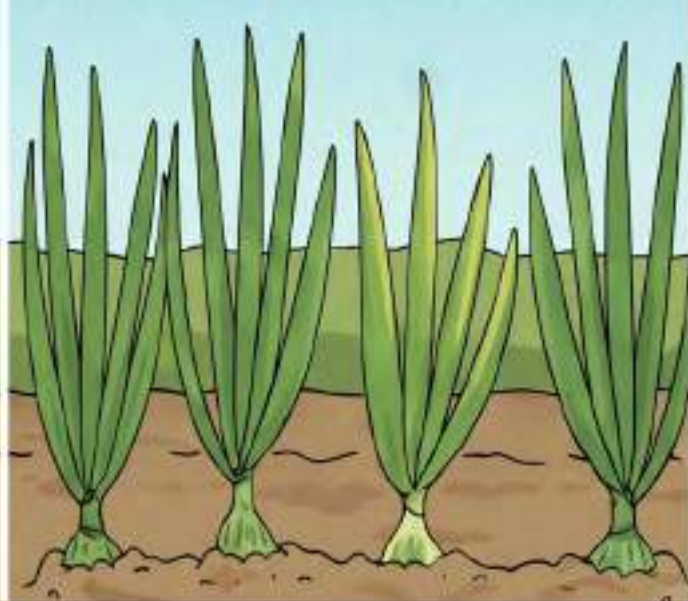




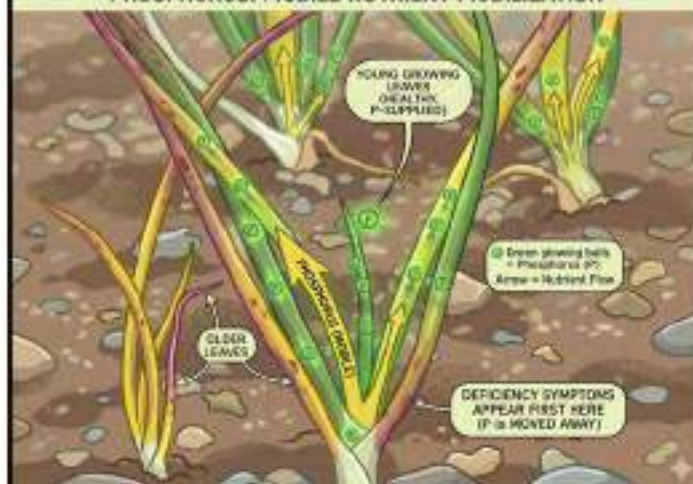
Top dressing of urea + irrigation



Foliar spray of urea @10 g per liter of water



PHOSPHORUS: MOBILE NUTRIENT MOBILIZATION



Dr. Kale: Phosphorus is mobile, so it shifts from older to younger parts—hence deficiency shows first on older leaves.

ADVANCED PHOSPHORUS DEFICIENCY: STUNTED GROWTH AND BULB FAILURE



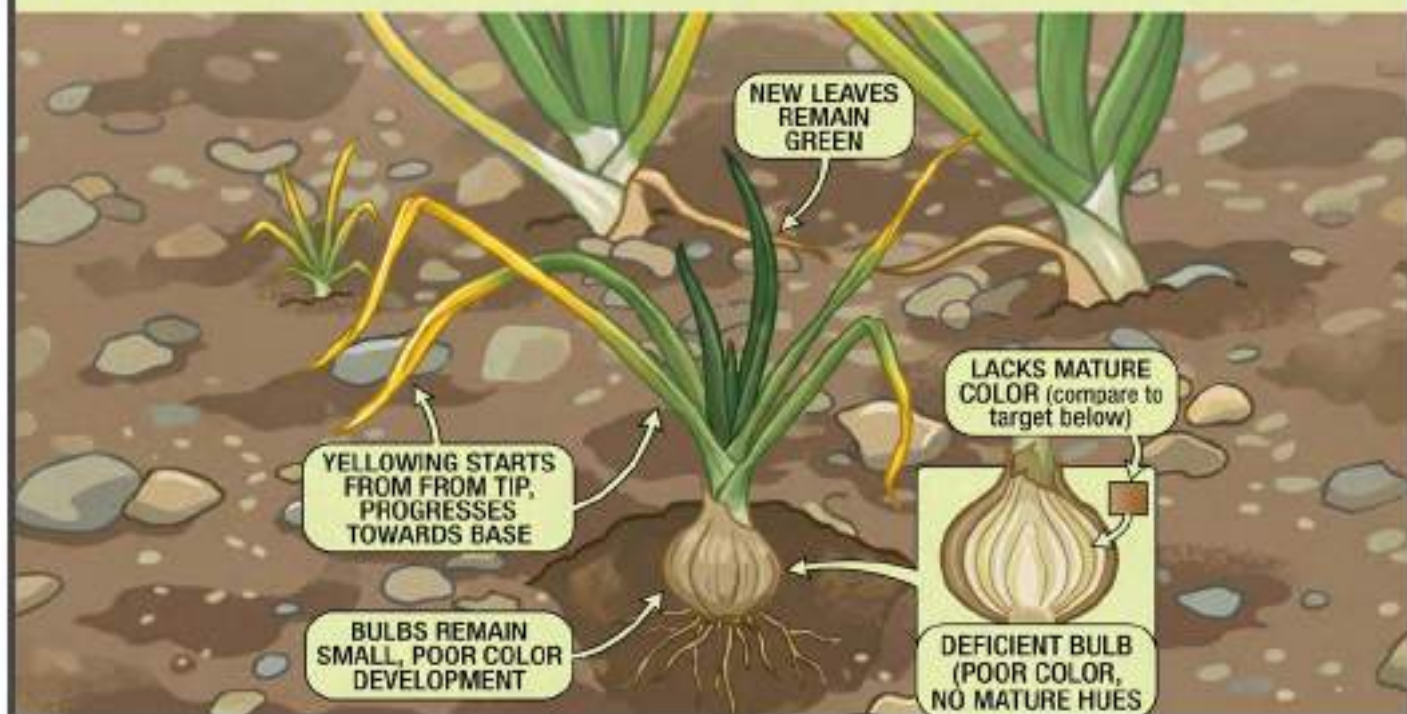
Dr. Kale: Older leaves turn yellow while young inner leaves stay dark green. Plants become stunted with poor roots and improper bulb formation, and bulbs look dull and wet, reducing market quality.

Sir,
how can we
correct phosphorus
deficiency?

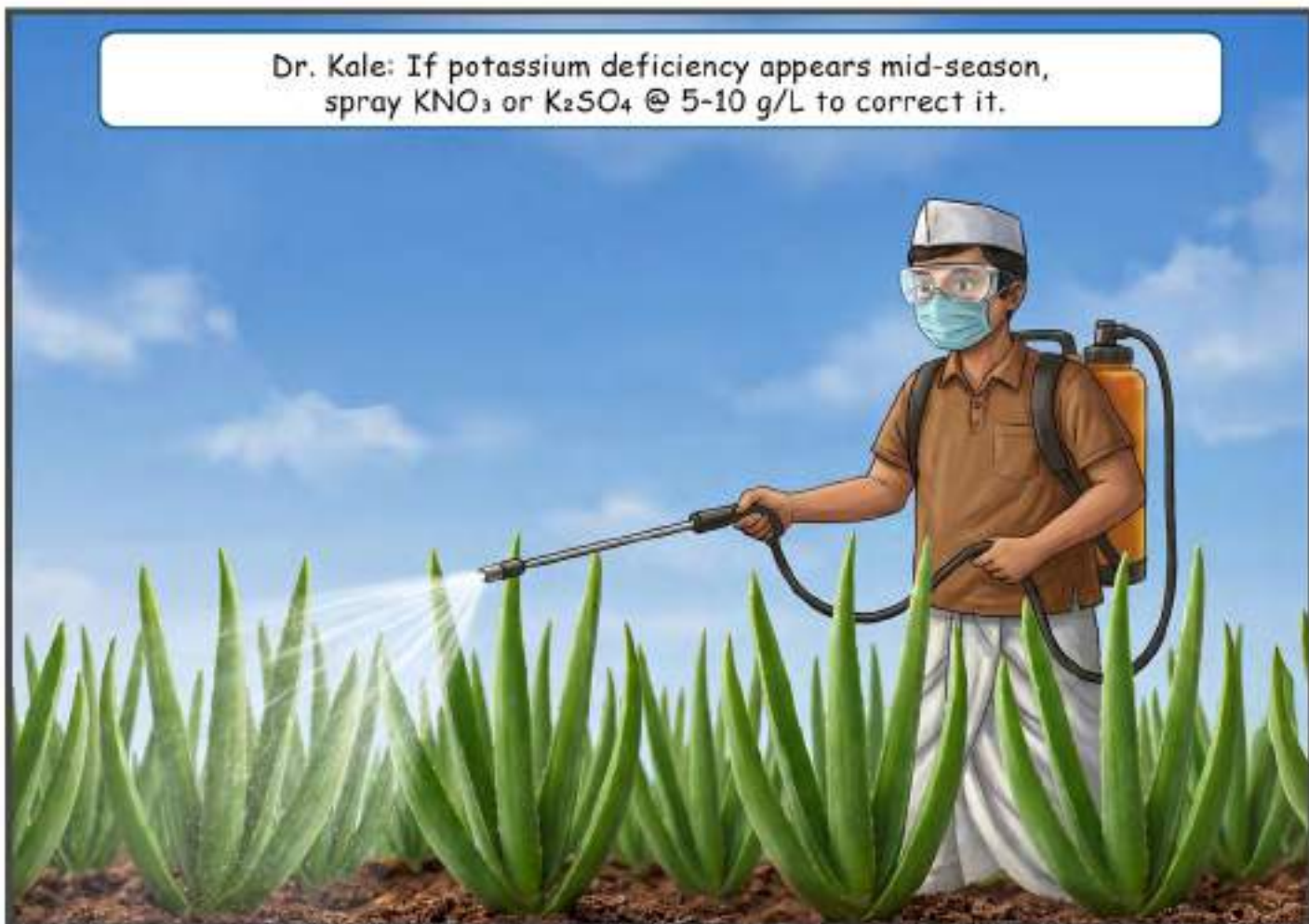
If the
deficiency
appears in the
mid-season, you
should go for
foliar spray.
Spray DAP @
10 grams per
liter of water
to quickly
correct the
deficiency.

Dr. Kale: Potassium deficiency shows first on older leaves—yellowing starts at the tip and moves downward. Bulbs stay small with poor colour development.

POTASSIUM DEFICIENCY: LEAF YELLOWING AND BULB STUNTING

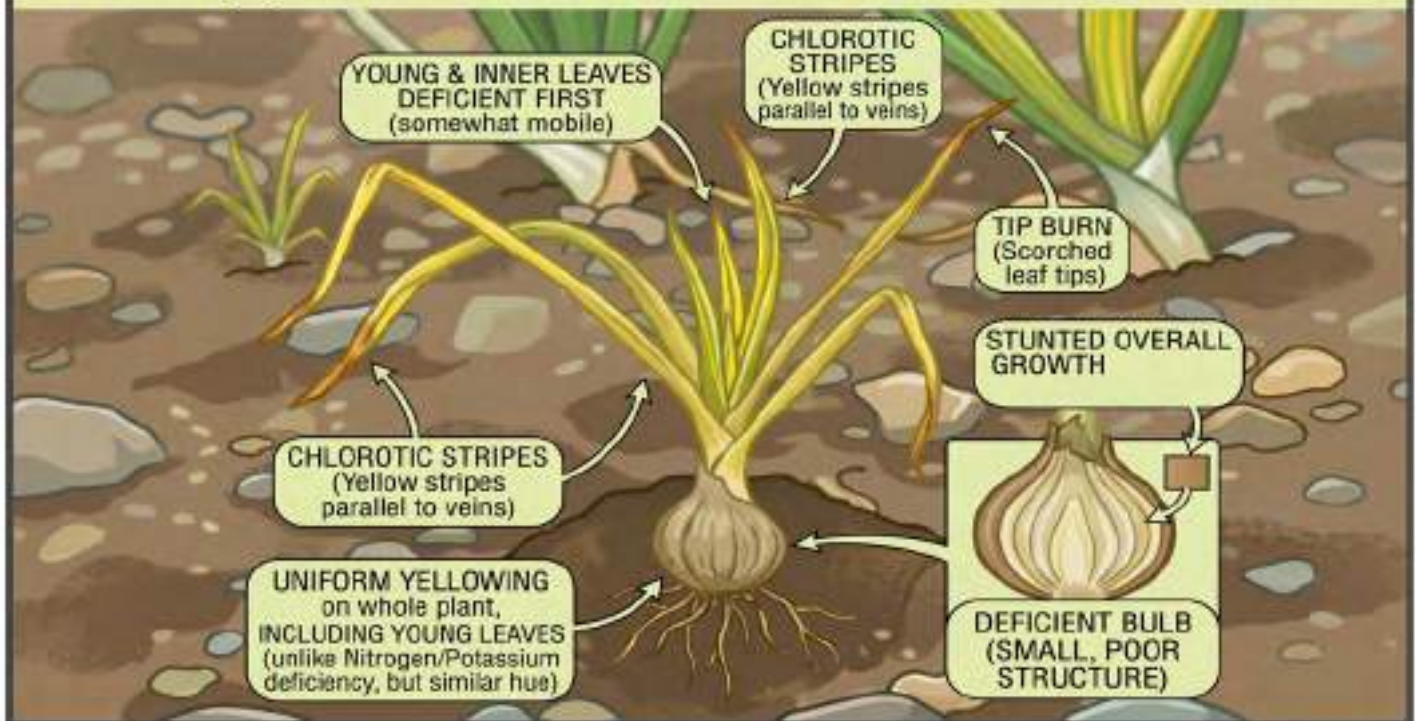


Dr. Kale: If potassium deficiency appears mid-season, spray KNO_3 or K_2SO_4 @ 5-10 g/L to correct it.



Dr. Kale: Sulphur deficiency appears on young leaves with uniform yellowing across the plant (unlike nitrogen). You may see chlorotic stripes, tip burn, stunted growth, and comparatively more root growth.

SULFUR (S) DEFICIENCY: SYMPTOMS & UNIFORM CHLOROSIS



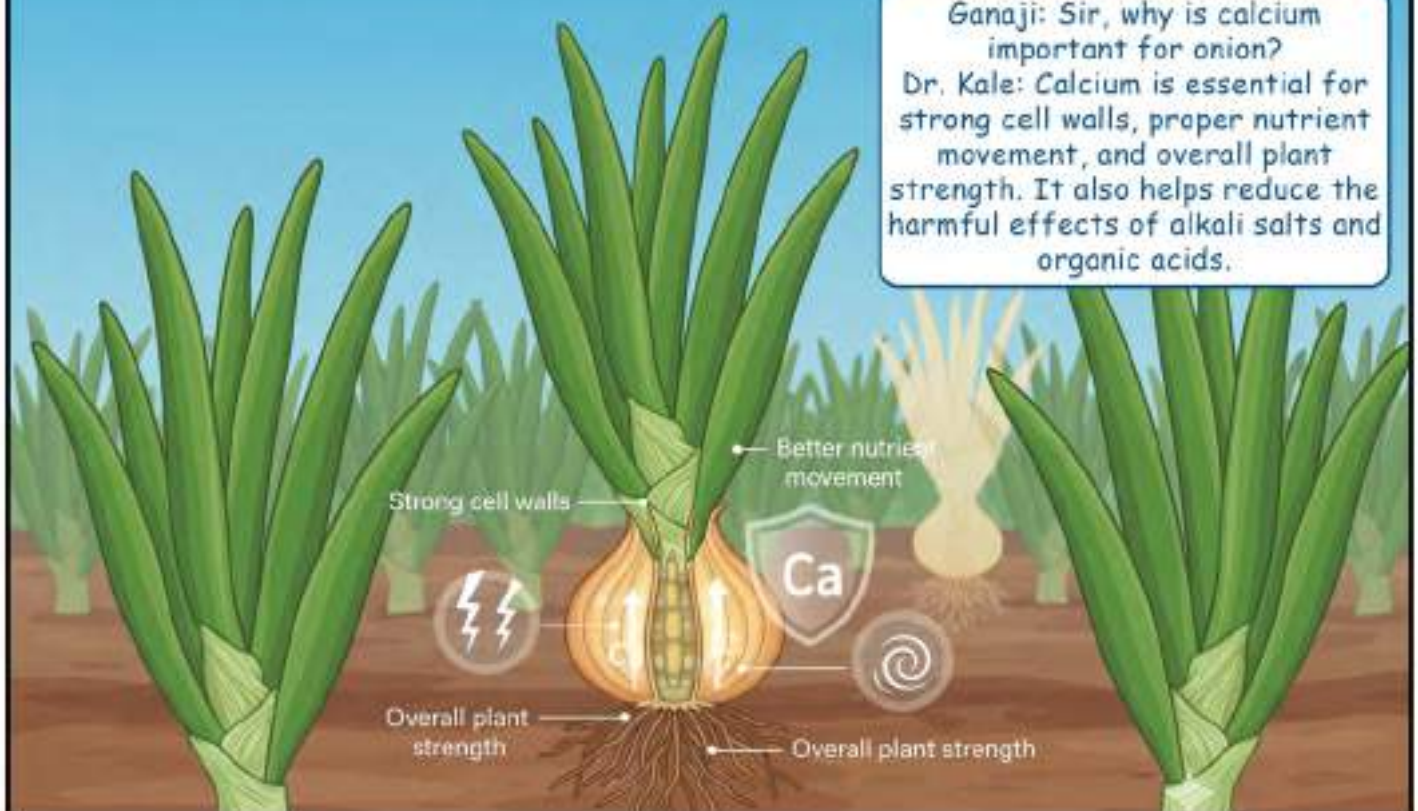
Shantaram: Sir, how can we manage sulphur deficiency?
Dr. Kale: If you see sulphur deficiency during crop growth, spray potassium sulphate @ 5 grams per liter of water.
Dattabhai: Now we understand sulphur deficiency, sir!



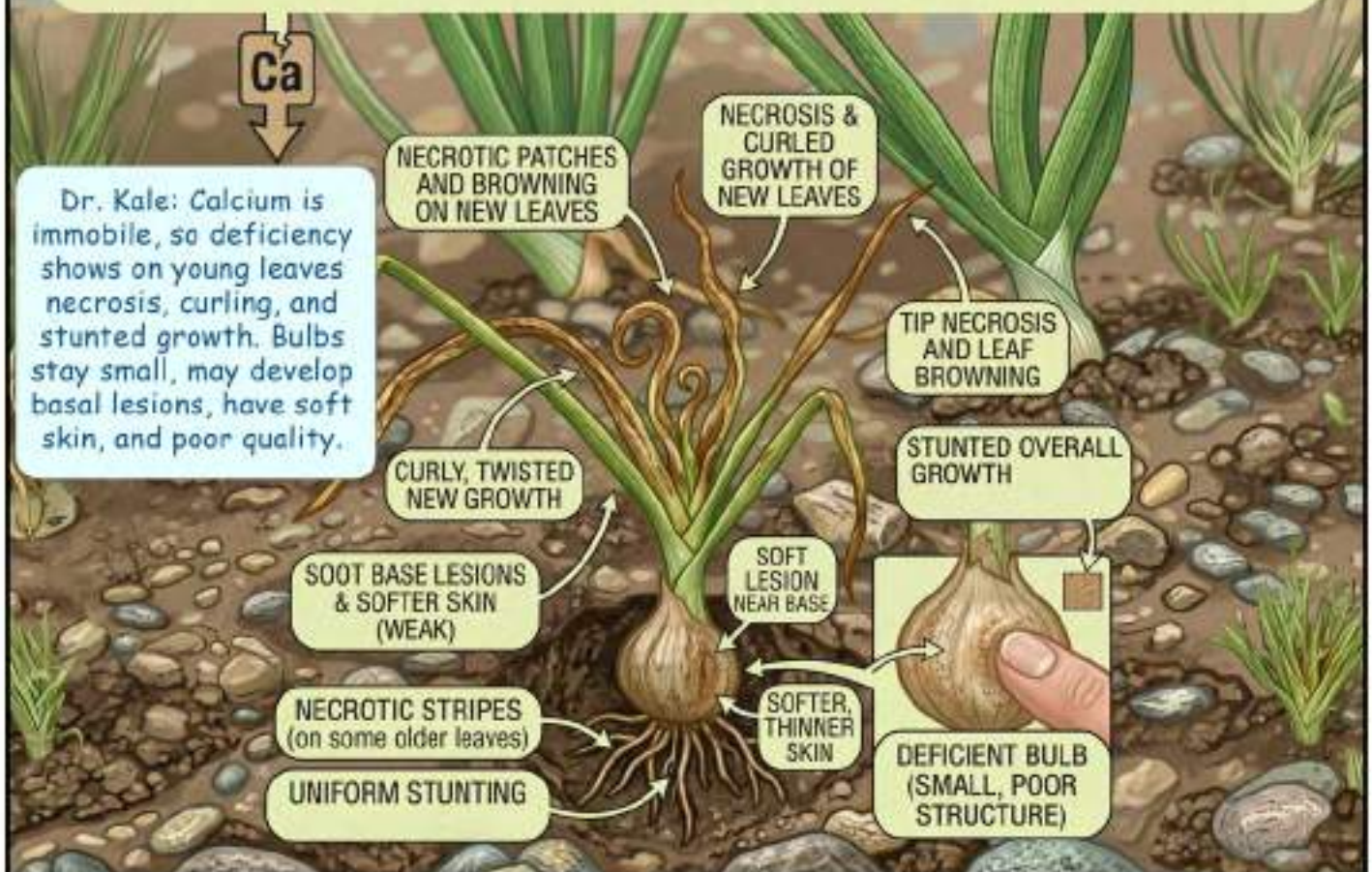
Calcium builds strong plants

Reduces harmful effects of salts and acids

Ganaji: Sir, why is calcium important for onion?
Dr. Kale: Calcium is essential for strong cell walls, proper nutrient movement, and overall plant strength. It also helps reduce the harmful effects of alkali salts and organic acids.



CALCIUM (Ca) DEFICIENCY: SYMPTOMS & BULB



Shantaram: Sir, how can we correct calcium deficiency?

Dr. Kale: You can apply lime or organic manure to the soil. A foliar spray of calcium nitrate (0.5%) helps correct the deficiency.



Foliar spray:
Calcium nitrate 0.5%



IRON (Fe) DEFICIENCY: SYMPTOMS & CHLOROSIS ON NEW LEAVES



Dr. Kale: When iron deficiency appears, spray iron chelates @ 2-5 g/L or ferrous sulphate @ 5 g/L for quick, temporary correction.

Sir, how can we recognize iron deficiency in onion?

Iron is immobile, so deficiency appears on young leaves as yellow chlorotic streaks, starting from the lower and inner parts.



Foliar spray for Iron Deficiency

Iron chelates: 2-5 g per liter
Iron sulphate: 5 g per liter
Temporary correction



Soil application: Ferrous sulphate @ 10 kg per ha.

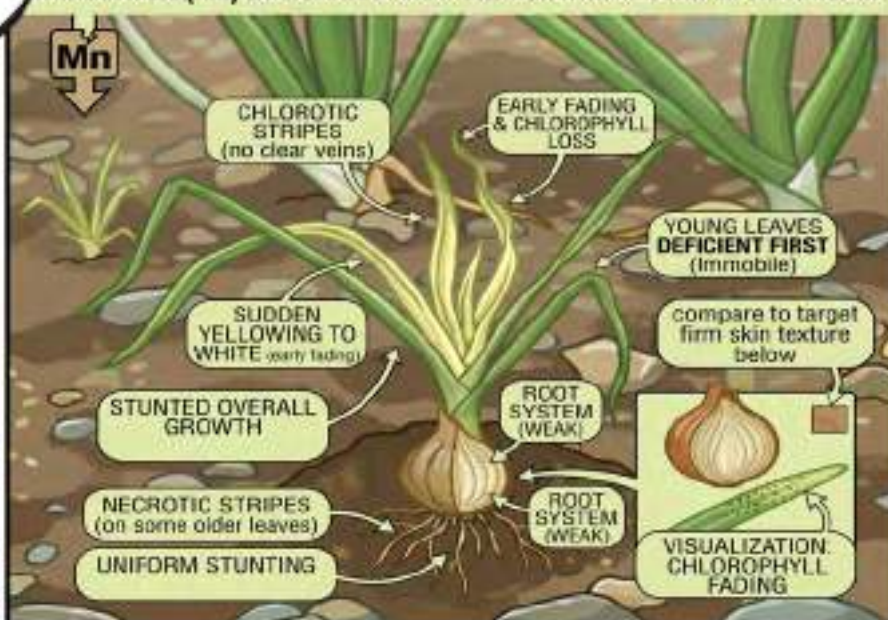


Then you should apply ferrous sulphate to the soil @ 10 kg per hectare

What if the soil itself is deficient in iron?



MANGANESE (Mn) DEFICIENCY: SYMPTOMS & CHLOROPHYLL LOSS ON YOUNG LEAVES



Foliar spray: Manganese sulphate 0.5%



Soil application: MnSO_4 @ 10 kg per ha.



IRON (Fe) DEFICIENCY: SYMPTOMS & CHLOROSIS ON NEW LEAVES

Dr. Kale: Zinc is immobile, so deficiency appears first on young leaves. They show yellowing (chlorosis), become elongated and twisted, with tip drying. Inner leaves turn yellow, and plants may show excessive root growth.

YELLOW CHLOROTIC STREAKS (no clear veins)

TOWARDS INNER SIDE

OLDER LEAVES DEFICIENT REMAIN GREEN

CHLOROSIS STARTS ON LOWER PART OF LEAF

compare to target firm skin texture below

NEW LEAVES DEFICIENT FIRST (Iron Immobile)

OLDER LEAVES REMAIN GREEN

UNIFORM STUNTING

BULB (MATURE HUES)

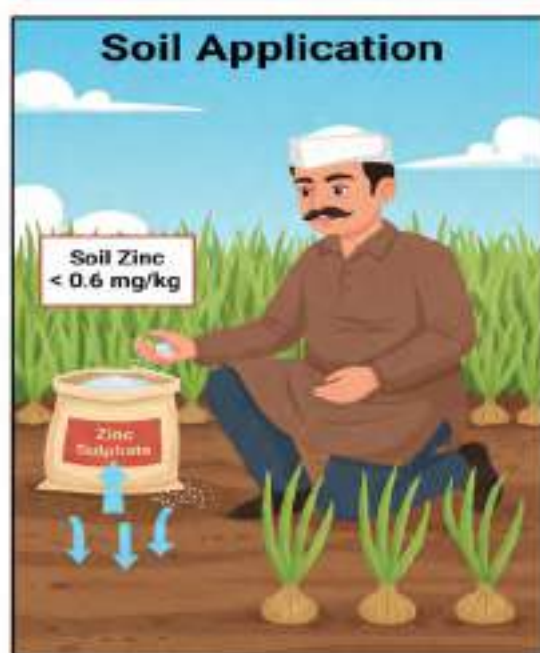
BULB (MATURE HUES)

POOR COLOR, NO MATURE HUES

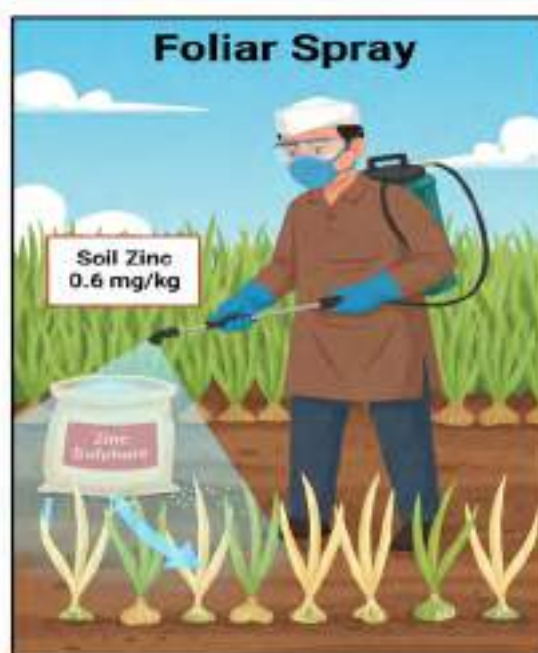
Shantaram: Sir, how can we correct zinc deficiency?

Dr. Kale: If soil zinc is low (<0.6 mg/kg), apply zinc sulphate @ 10 kg/ha to the soil, followed by a foliar spray of zinc sulphate @ 5 g/L to correct the deficiency.

Correcting Zinc Deficiency



Soil application: Zinc sulphate @ 10 kg per ha.



Foliar spray: Zinc sulphate @ 5 g per liter of water

COPPER (Cu) DEFICIENCY: SYMPTOMS & BULB FORMATION FAILURE



Dattabhau: Sir, how can we identify copper deficiency in onion?

Dr. Kale: Copper is slightly mobile, and onion is very sensitive to its deficiency. Symptoms start with tip drying of young leaves, which gradually spreads towards the base. In severe cases, the entire leaf dries. Plants show poor root growth, and bulb formation may not occur.

Foliar spray: Copper sulphate @ 2– 5 g per liter of water

Dattabhau: How can we correct copper deficiency?

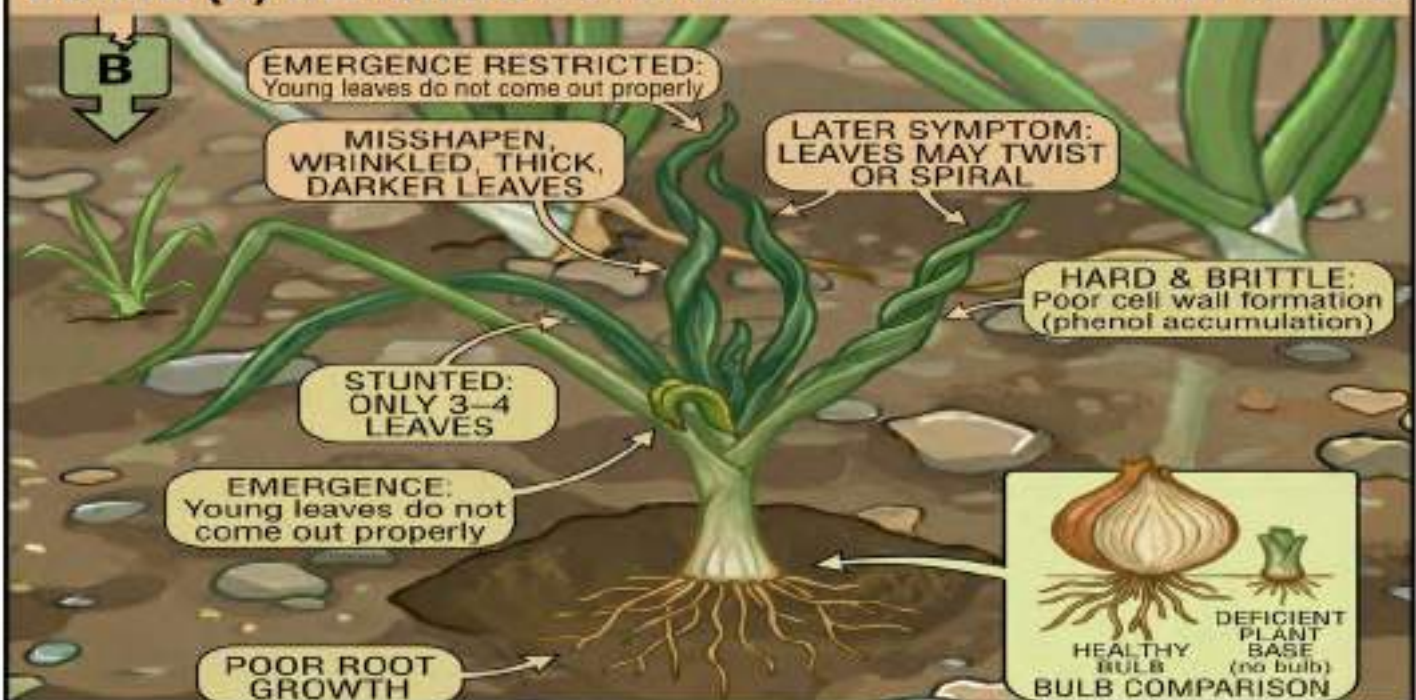
Dr. Kale: Do a foliar spray when symptoms appear.

Shantaram: What should we spray?

Dr. Kale: Spray copper sulphate @ 2-5 g/L of water.



BORON (B) DEFICIENCY: SYMPTOMS & BULB DEVELOPMENT FAILURE

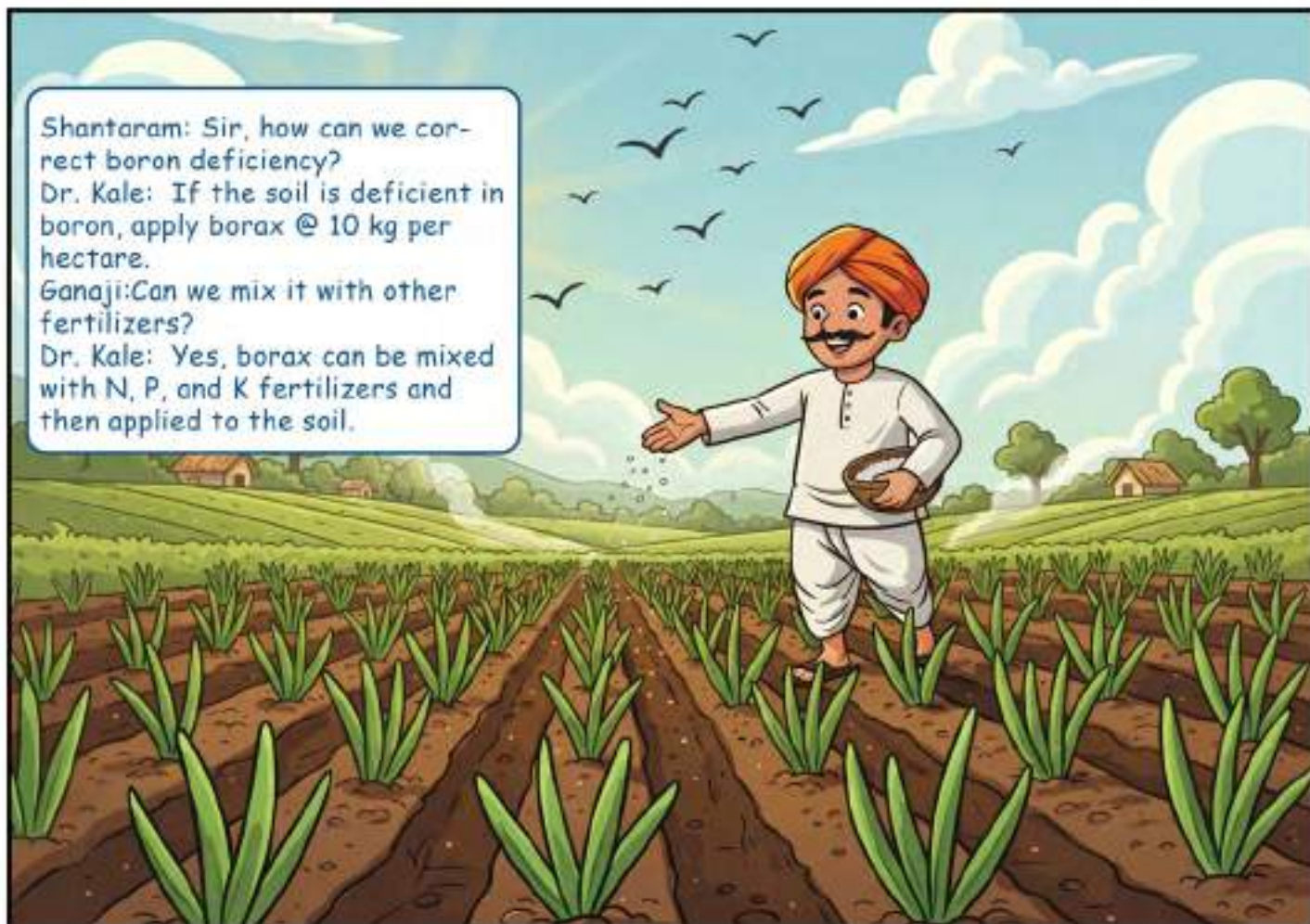


Shantaram: Sir, how can we correct boron deficiency?

Dr. Kale: If the soil is deficient in boron, apply borax @ 10 kg per hectare.

Ganaji: Can we mix it with other fertilizers?

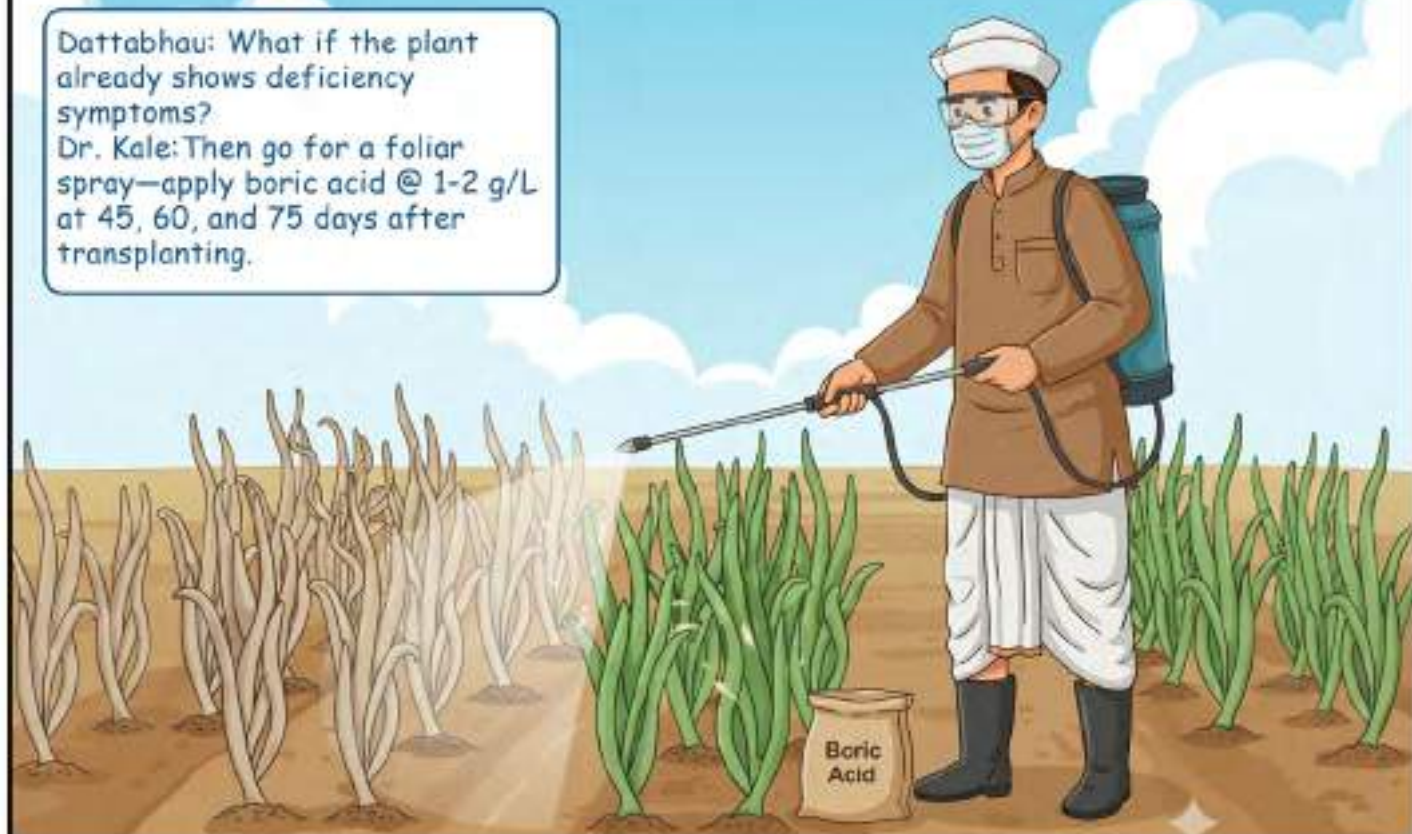
Dr. Kale: Yes, borax can be mixed with N, P, and K fertilizers and then applied to the soil.



Foliar spray: Boric acid @ 1-2 g per liter of water

Dattabhai: What if the plant already shows deficiency symptoms?

Dr. Kale: Then go for a foliar spray—apply boric acid @ 1-2 g/L at 45, 60, and 75 days after transplanting.

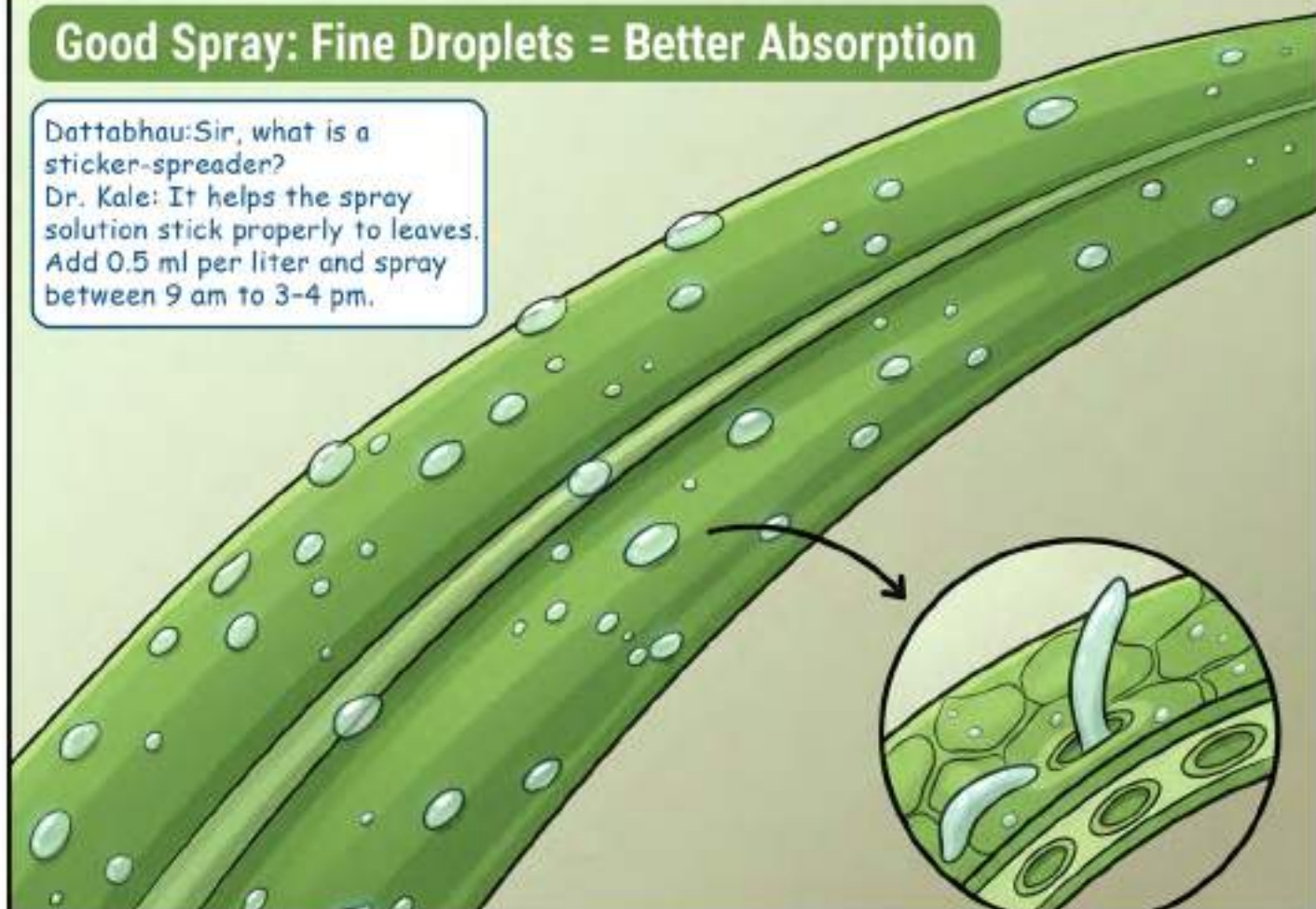




Good Spray: Fine Droplets = Better Absorption

Dattabhai: Sir, what is a sticker-spreader?

Dr. Kale: It helps the spray solution stick properly to leaves. Add 0.5 ml per liter and spray between 9 am to 3-4 pm.



Biofertilizers contain living microorganisms

They help plants grow better

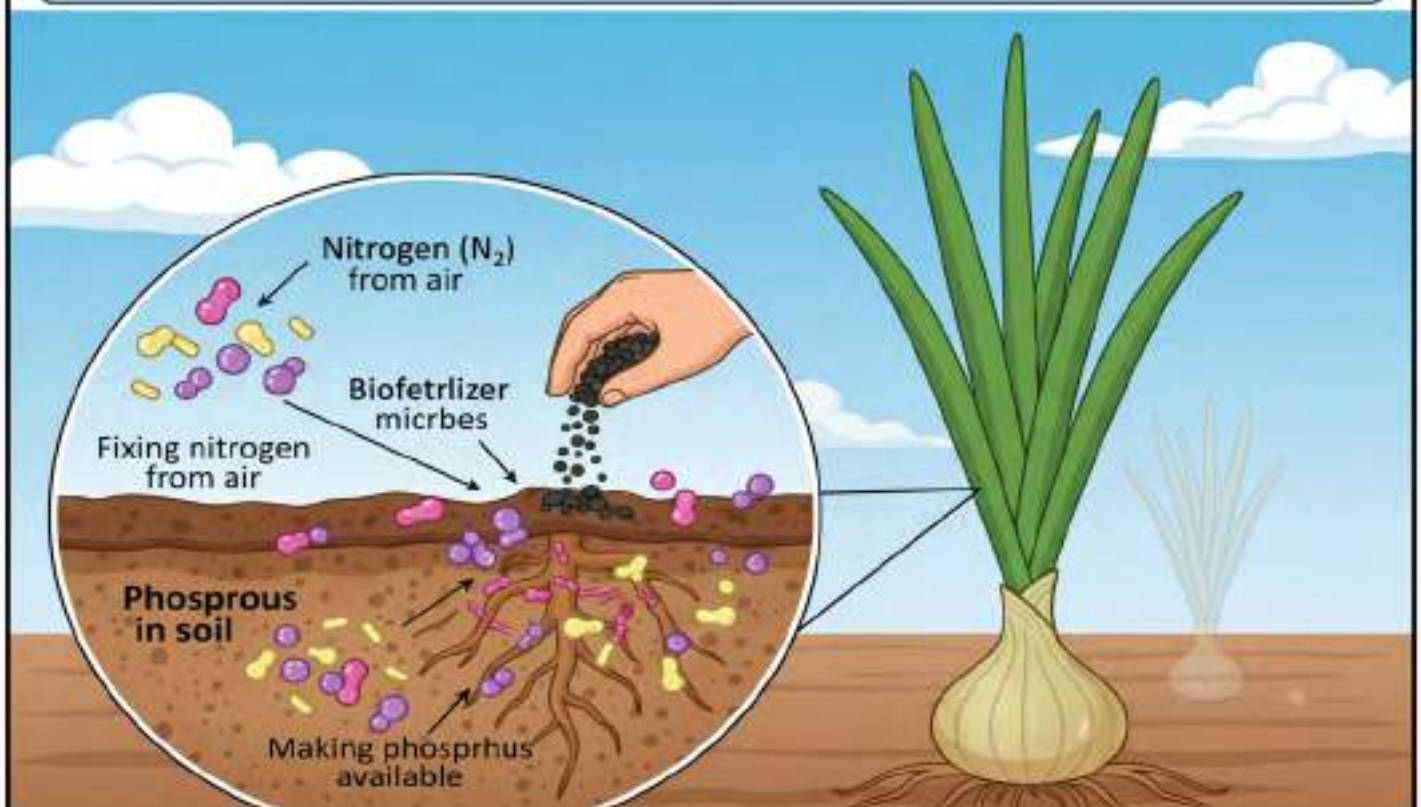
Ganaji: Sir, what are biofertilizers?

Dr. Kale: Biofertilizers are substances that contain living microorganisms which help plants grow better.



Dattabhau: How do they help the crop, sir?

Dr. Kale: When applied to seeds or soil, these microbes colonize the root zone and improve nutrient availability. They help by fixing nitrogen from the air and making phosphorus



Shantaram: Sir, which biofertilizers are good for onion?
Dr. Kale: Based on experiments at ICAR-DOGR, we recommend:
• Azotobacter @ 5 kg/ha, and
• PSB (Phosphate Solubilizing Bacteria) @ 5 kg/ha.



Step 1: Biofertilizers with 50 kg compost and keep overnight

Step 2: Apply in soil during transplanting

Dr. Kale: Mix both biofertilizers with 50 kg compost, keep overnight, and apply to the soil at transplanting.

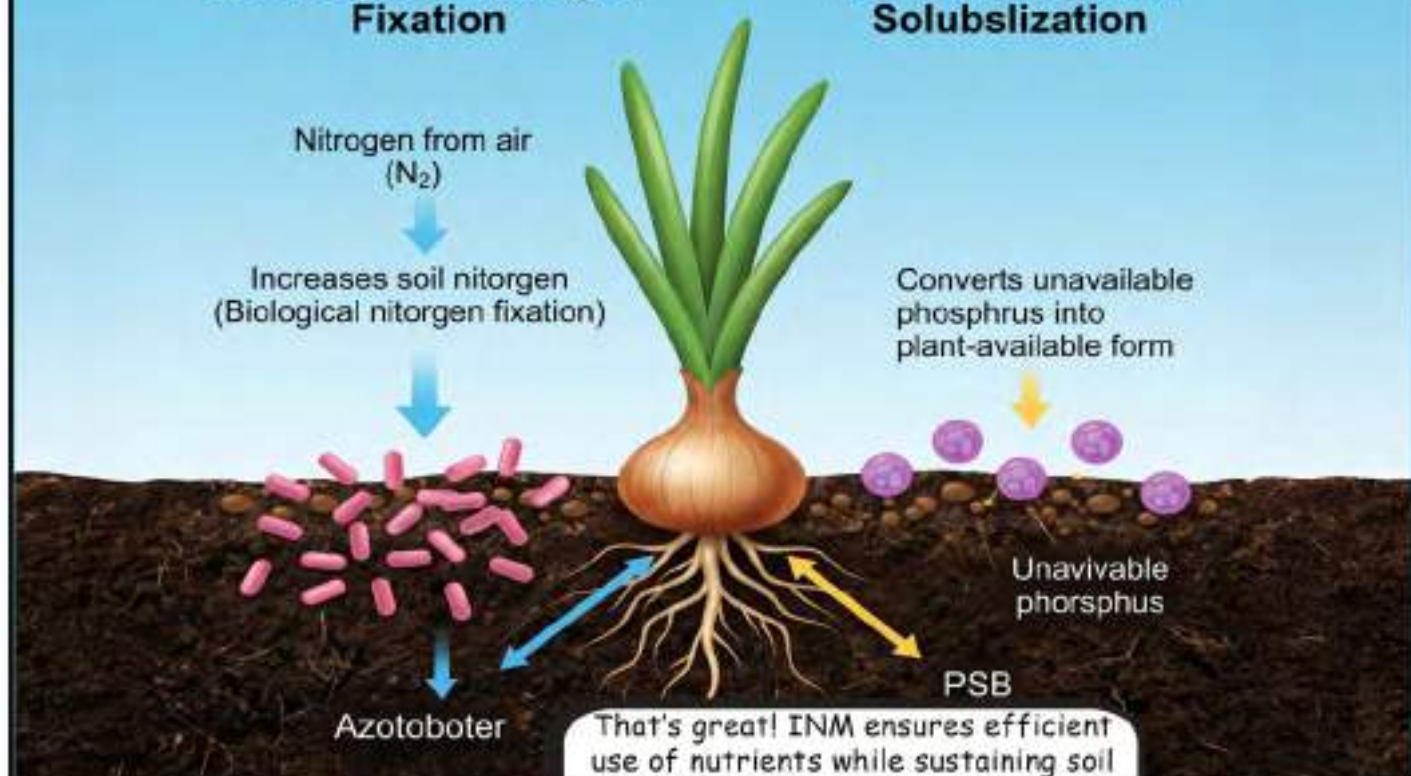


Shantaram: What are the benefits of using these biofertilizers?

Dr. Kale: Azotobacter adds nitrogen to the soil through biological fixation. PSB converts unavailable phosphorus into a form plants can absorb. It also improves the efficiency of applied phosphorus fertilizers.

Azotobacter: Nitrogen Fixation

PSB: Phosphorus Solubilization



That's great! INM ensures efficient use of nutrients while sustaining soil fertility for the future. Keep following ICAR-DOGR recommendations regularly for the best results.

Sir, your guidance on Integrated Nutrient Management will help us maintain soil health and improve productivity. Thank you!



• STORY 4 •

Weed-Free Fields, Better Yields



Integrated Weed Management







Both onion and garlic are input-intensive cash crops. Their initial growth is very slow; the plants are short in stature, have shallow roots, and require regular irrigation and fertilizers. For these reasons, these crops cannot tolerate competition from weeds



If weeds are not controlled on time, onion yield can reduce by 40-80%. Therefore, weed control is crucial during the first 4 to 6 weeks of the crop.



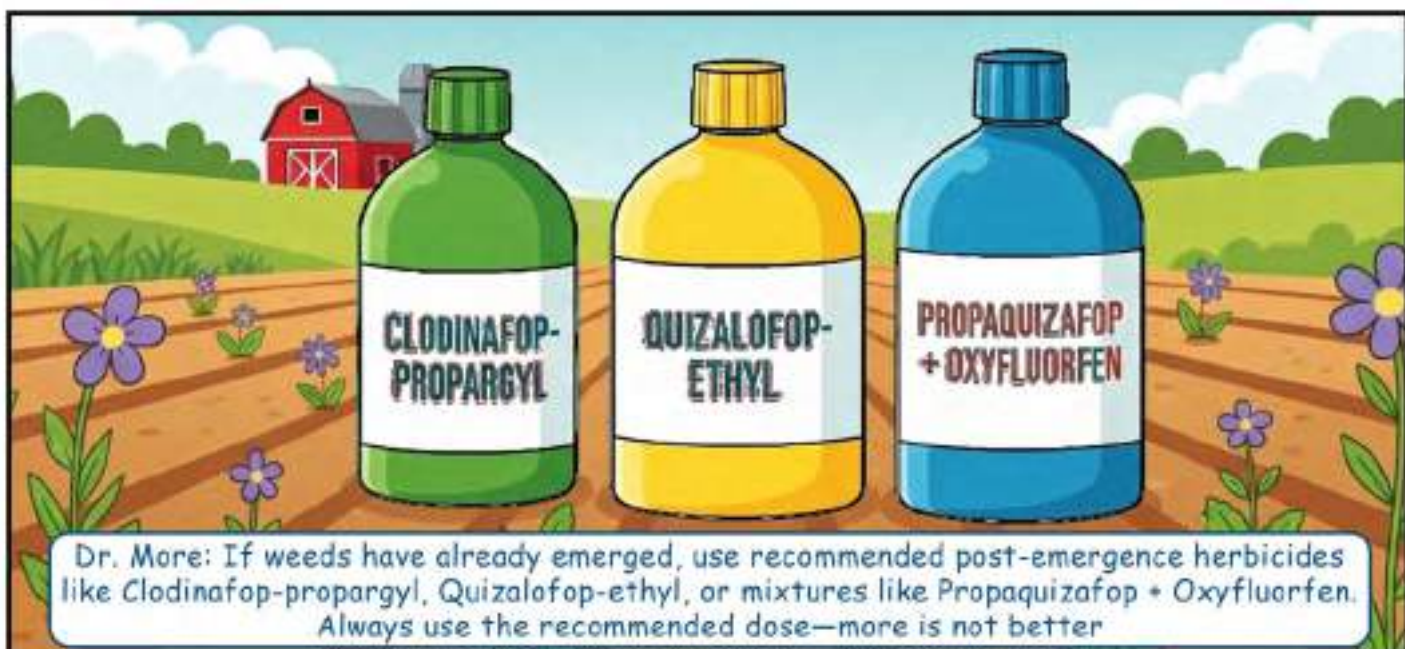
Commonly found weeds in the fields include both broad-leaf and grassy varieties, such as: Parthenium (Congress grass), Cynodon (Doob grass), Nut Grass (Nagarmotha), Field Bindweed (Hirankhuri), Chenopodium (Bathua), Wild Oats (Jungli Jai) and Commelina (Kanakua)

Weed control starts in the nursery. To protect seedlings, spray within 24-48 hours after sowing and first irrigation using Oxyfluorfen (1.5-2 ml/litre) or Pendimethalin (3.5-4 ml/litre). This controls weeds early and helps produce strong, healthy seedlings.

In the main field, apply weed control before transplanting or within 48 hours after transplanting using Oxyfluorfen (1.5-2 ml/litre) or Pendimethalin (3.5-4 ml/litre). Use only recommended and registered herbicides for safe and effective weed management.



Dr. More: Remember one important thing—no spray can replace one good hand weeding. If you do hand weeding once between 40 to 60 days, your field will remain clean for a long



Dr. More: If weeds have already emerged, use recommended post-emergence herbicides like Clodinafop-propargyl, Quizalofop-ethyl, or mixtures like Propaquizafop + Oxyfluorfen. Always use the recommended dose—more is not better



Now I will tell you another easy and natural method to control weeds — mulching.

Mulching?
What is that, sir?

Don't just rely on hand weeding and chemicals sprays to control weeds. We must be smart. Mulching is a game-changer. By covering the soil, you starve weeds of sunlight. It's particularly good for those stubborn ones like Nagarmotha.



Dr. More: For safe and effective spraying, use a sticker, spray on slightly moist soil, and avoid entering the field immediately after spraying. Always wear safety gear. Proper weed management in the first 30-45 days improves yield and bulb quality.



Dr. More: This is integrated weed management—use crop rotation, balanced fertilizers, and timely weeding for better soil, lower cost, and effective weed control.



Thank you sir for this very useful training. We learned many new and practical things today. We will follow the weed management practices recommended by ICAR-DOGR, Pune.

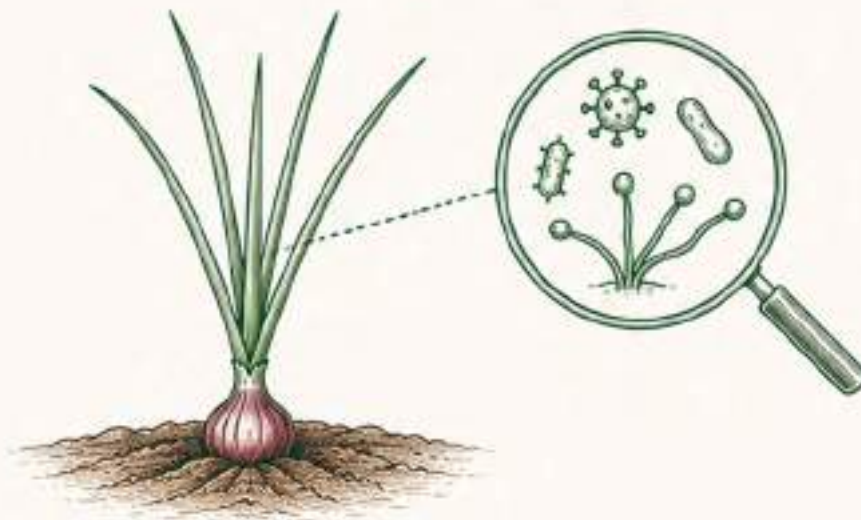


• **STORY 5** •

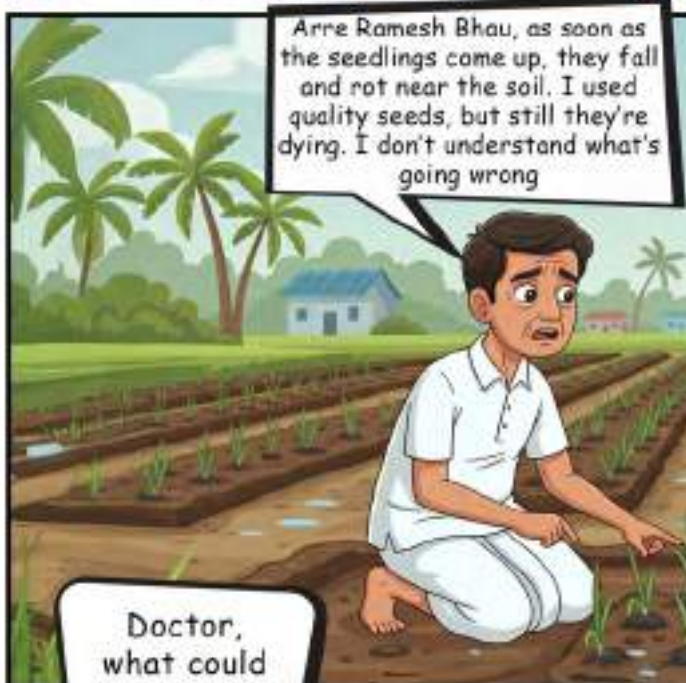
The Microscopic Enemies



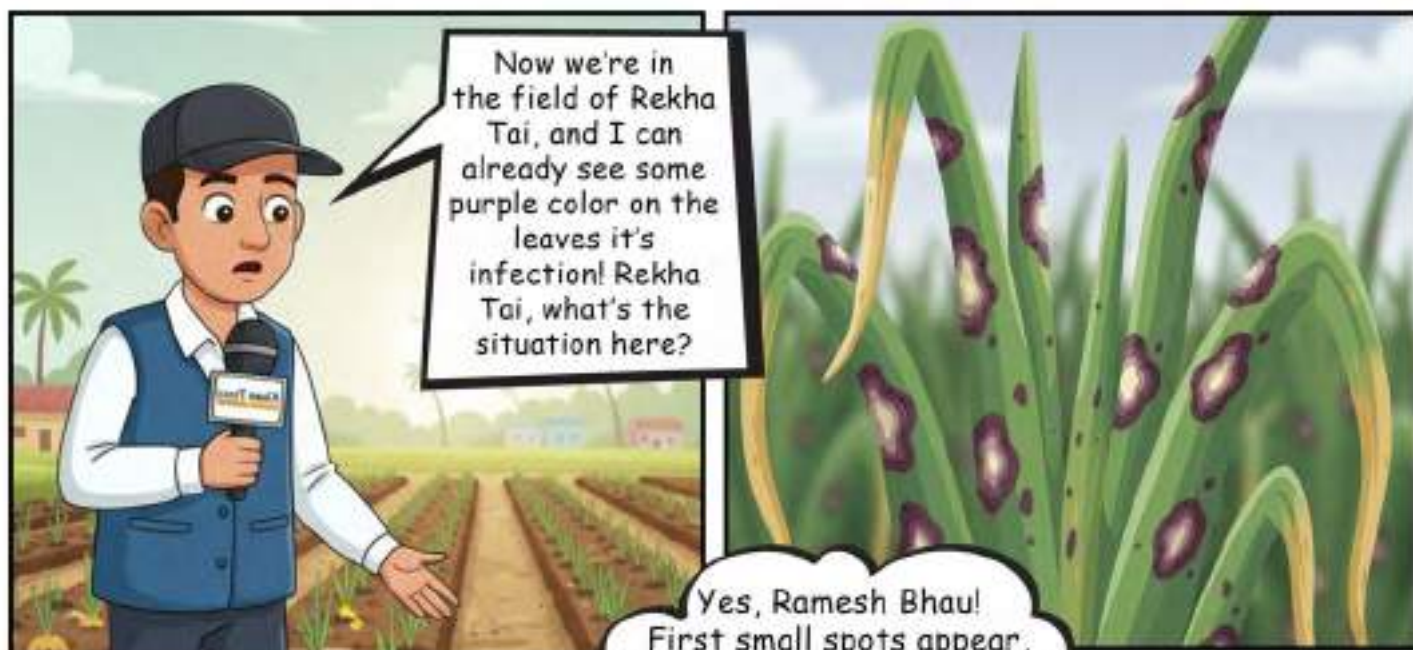
Integrated Disease Management

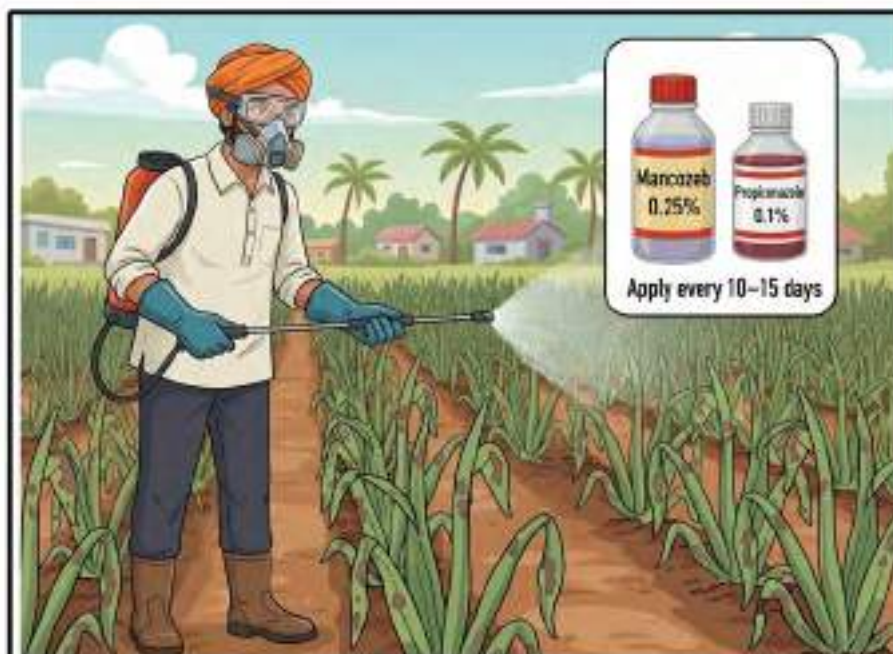












- ✓ Keep proper spacing for air circulation.
- ✓ Spray Mancozeb 0.25% or Propiconazole 0.1% every 10-15 days.
- ✓ Always remove and destroy infected leaves.

Our next stop — Ganesh Bhau's field. His onions are turning brown and drying from the tip. Let's check what's wrong." Ganesh Bhau, looks like your onions are under attack too! What's troubling your crop?

Yes, Ramesh Bhau. The leaves turn brown and break from the tip. The bulbs stop growing. I tried spraying something, but it didn't work.



Don't worry Ganesh bhau we have expert with us today who will help you with this problem





Dr. Jayalakshmi: This is Stemphylium Blight. Small yellow to orange flecks appear on the leaves, which develop into elongated, spindle- or oval-shaped spots with a pinkish margin. The spots spread from the tip toward the base, merge into larger patches, and eventually cause blighting of the entire foliage.

Dr. Jayalakshmi: Here's what Ganesh should do:

- ✓ Avoid continuous onion cropping — rotate crops with non-host crops such as cabbage, cauliflower and mustard
- ✓ Spray fungicides, Mancozeb @ 0.25% / Tricyclazole @ 0.1% / Hexaconazole @ 0.1% / Propiconazole @ 0.1% / Metiram 55% + Pyraclostrobin 5% WG @ 0.2% / Azoxystrobin 18.2% + Difenoconazole 11.4% SC @ 0.125% at 10-15 days interval from 30 days after transplanting or as soon as disease appears

Stemphylium Blight: Control Measures



Avoid continuous onion cropping rotate crops.



Use Hexaconazole (0.1%) or Tricyclazole (0.1%) for control.



Don't overuse nitrogen fertilizers it increase susceptibility.*

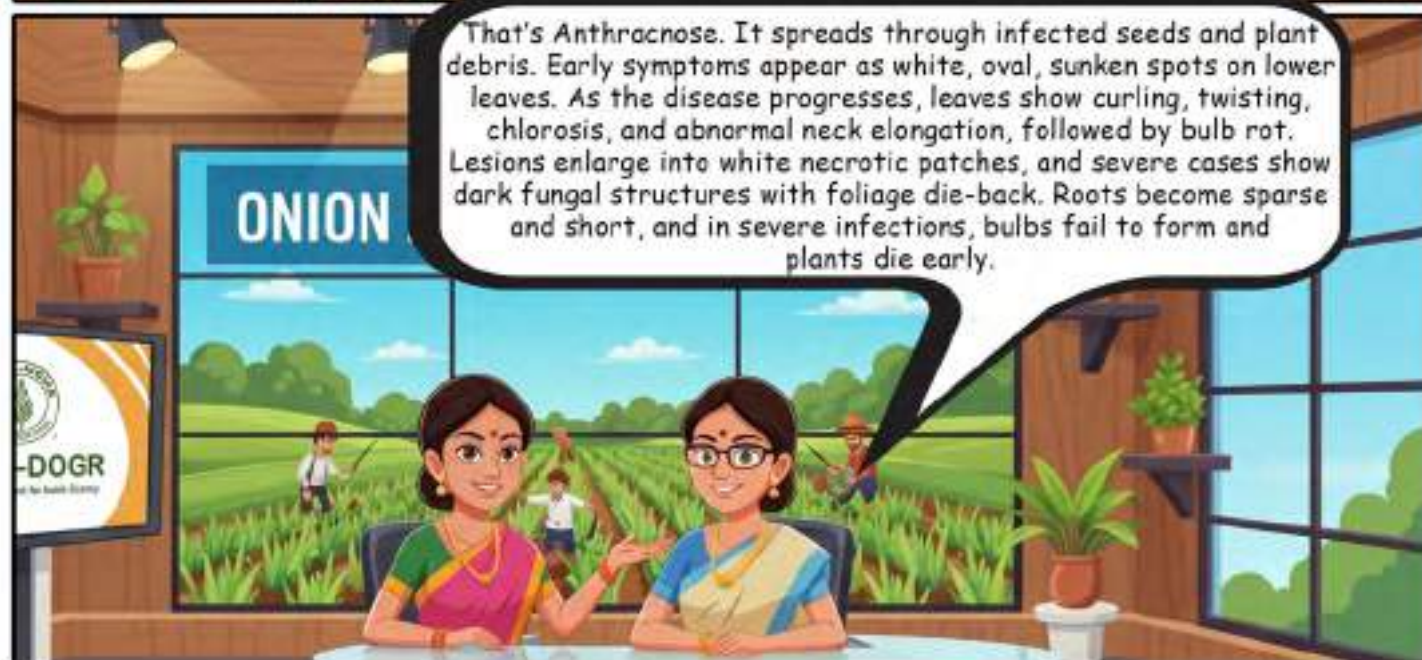




After meeting farmers battling Damping Off, Stemphylium Blight, and Purple Blotch, our journey continues. Each field has its own story—of struggle and recovery. Here in this part of the village, there's talk of a disease spreading like wildfire.

Yes, Ramesh Bhau. The leaves get black and twisted, and bulbs don't form properly. I used the same seed as last year.

Let's meet Shankar Bhau, who's facing this problem firsthand



That's Anthracnose. It spreads through infected seeds and plant debris. Early symptoms appear as white, oval, sunken spots on lower leaves. As the disease progresses, leaves show curling, twisting, chlorosis, and abnormal neck elongation, followed by bulb rot. Lesions enlarge into white necrotic patches, and severe cases show dark fungal structures with foliage die-back. Roots become sparse and short, and in severe infections, bulbs fail to form and plants die early.



Wonderfull Prevention truly is better than cure. So, friends, this was today's Onion Alert. Thank you to our farmers — Balu, Rekha, Ganesh, and Shankar — for sharing their experiences, and to Dr. Jayalakshmi for giving us practical, field-based solutions. Until next time, take care of your crops —because healthy onions mean a healthy income! See you soon in the next episode.

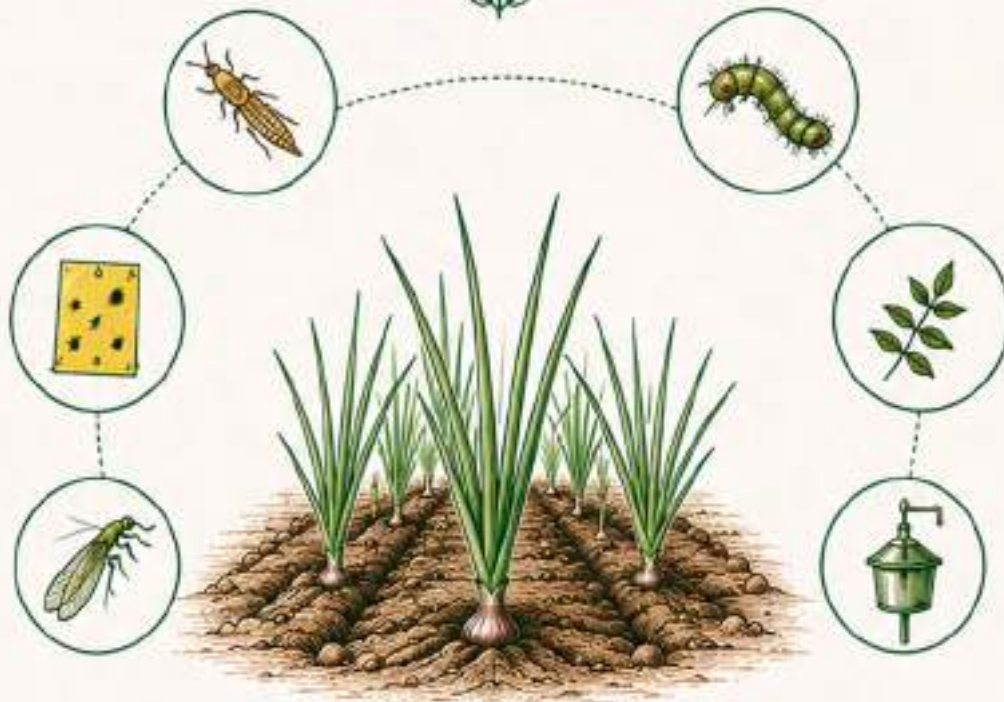


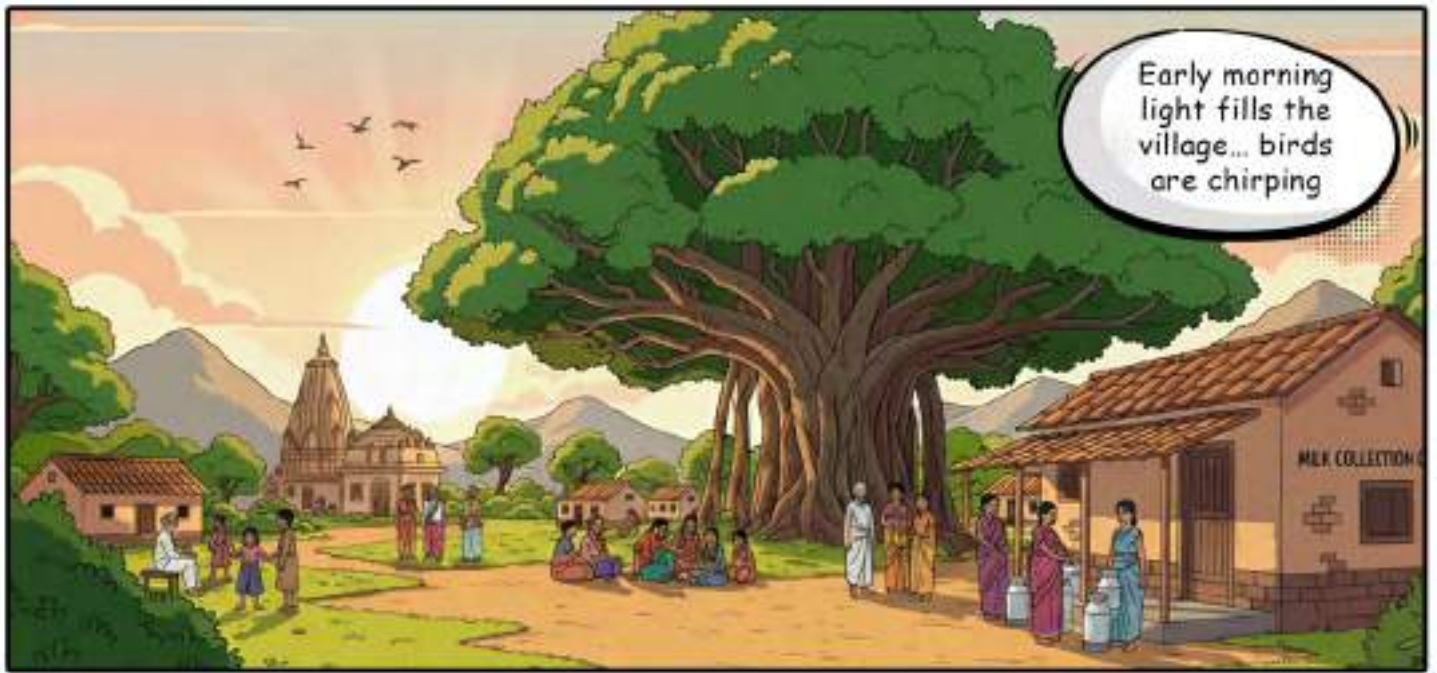
• STORY 6 •

Battle with Pests



Integrated Pest Management







Here... eat while it's
still warm. You've
been in the field
since sunrise.

The soil looks
good today. If the
weather supports
us, the onion crop
should grow well.

Hmm... I pray
this season turns
out better than the
last one. You are
working so hard.

You're right.
A new season is
starting... let's hope
it brings good news.



Together, Kishanlal and Suman begin transplanting the young onion seedlings with care. With gentle watering and a touch of fertilizer, their field slowly comes alive with new hope.



Yes! All our hard work is finally showing. This crop will be a good one

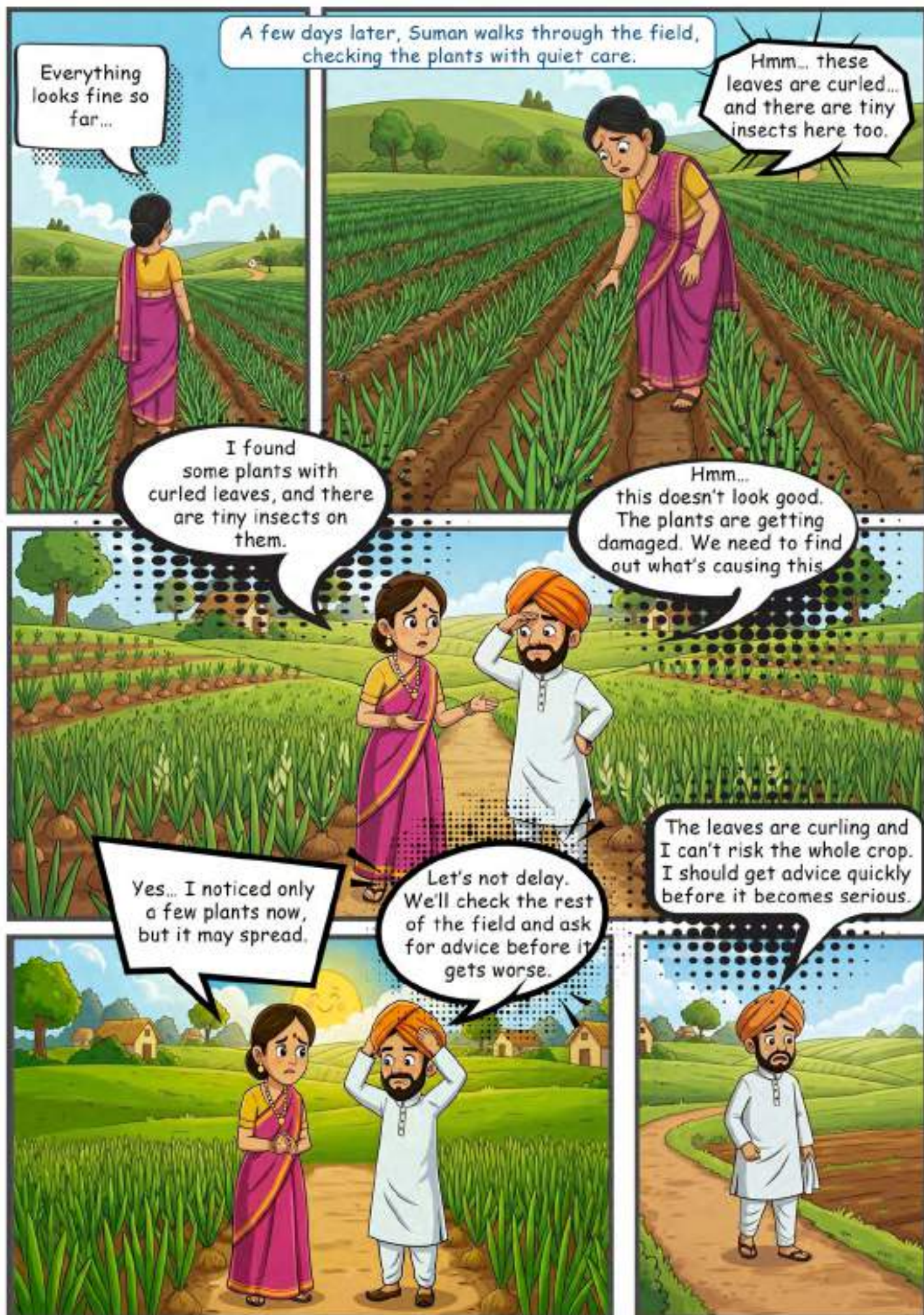


Look at the field, everything is growing so well!



The Climate is changing.... We should visit our field.

Yes





The next day, the farmers visited ICAR-Directorate of Onion and Garlic Research, Pune, seeking guidance for their crop.

Namaste Sir, I have planted onion crop in my field. but, some of my onion plants have curled and twisted leaves... and we noticed tiny insects on them.

Hmm...
I understand.
Let me see the samples
you brought

We want
to control it before
the damage
increases.

Kishanlal
showing the scientist
the affected
plant sample

This is thrips attack.
But don't worry — with
proper management,
we can control it.

Onion crops are affected by several major pests, and effective control starts with understanding how these pests feed. Integrated Pest Management (IPM) combines preventive practices with targeted control methods to manage pests safely and effectively. This overview covers key onion pests, their feeding habits, and the best IPM strategies to control



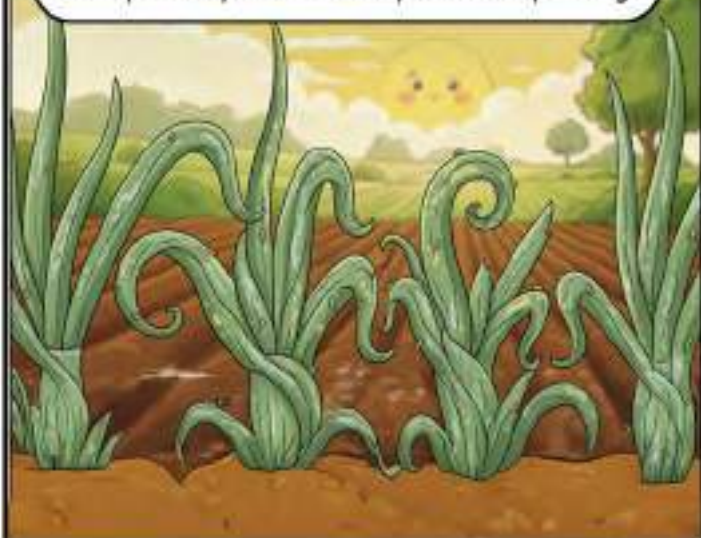
Dr. Kale: Let's begin by learning about thrips, since they are one of the most common pests in onion.

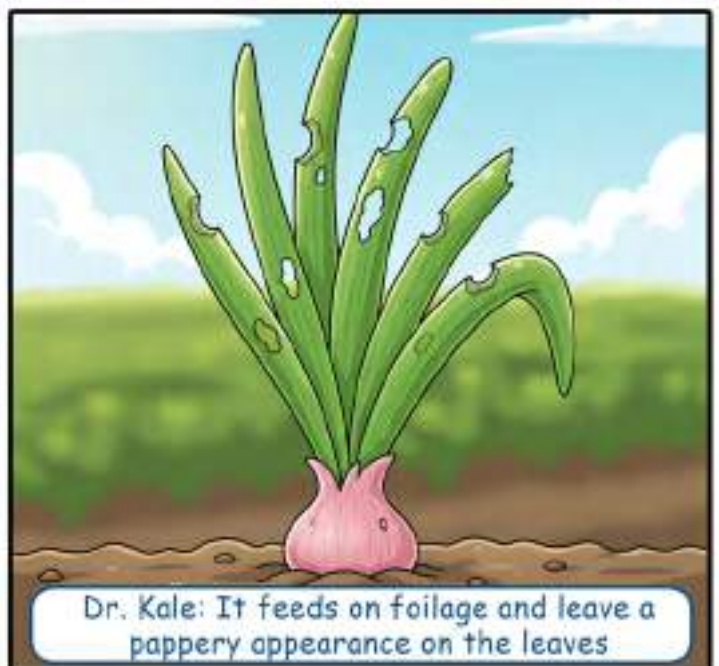
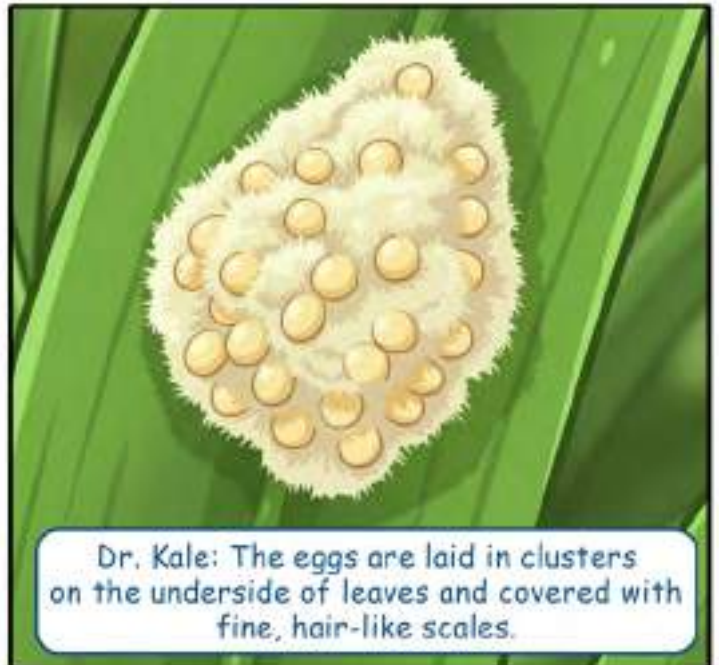


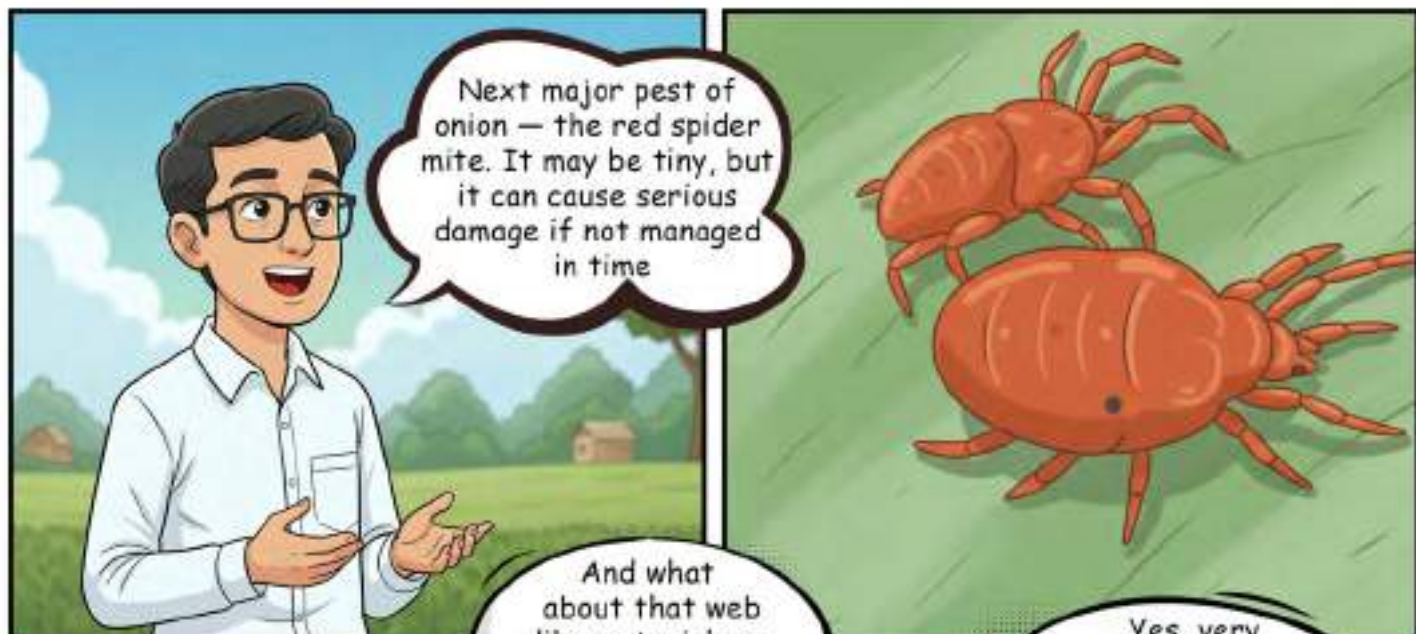
Yes, sir... I witnessed the same symptoms in my field.

Yes, that's because your crop has thrips infestation.

Dr. Kale: Thrips infestation can be identified by curling and twisting of leaves at the early stage most probably within 45 days to transplanting.



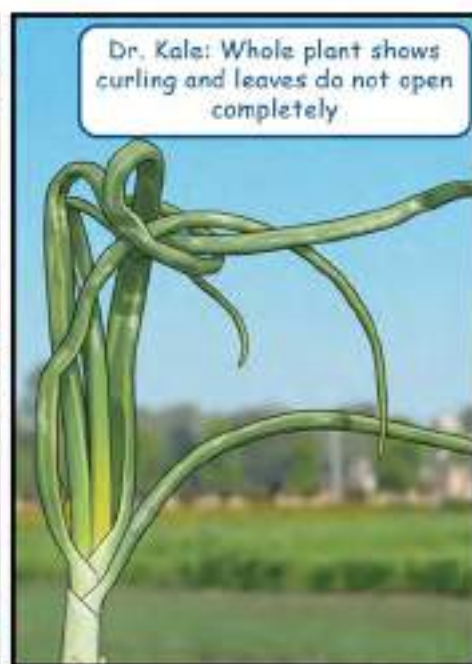




Yes, very fine silk webbing is formed by these mites. That's the sign of infestation.



Dr. Kale: Infested leaves becomes discoloured and may fall off eventually



Dr. Kale: Firstly, keep the field weed-free. Remove alternate weed hosts from the field and keep the field clean



Dr. Kale: Seedlings should be dipped in carbosulfan 0.2% + carbendazim 0.1% solution before transplanting

Kale: Avoid successive plantation of onion

Don't grow onion on the same piece of land every season.

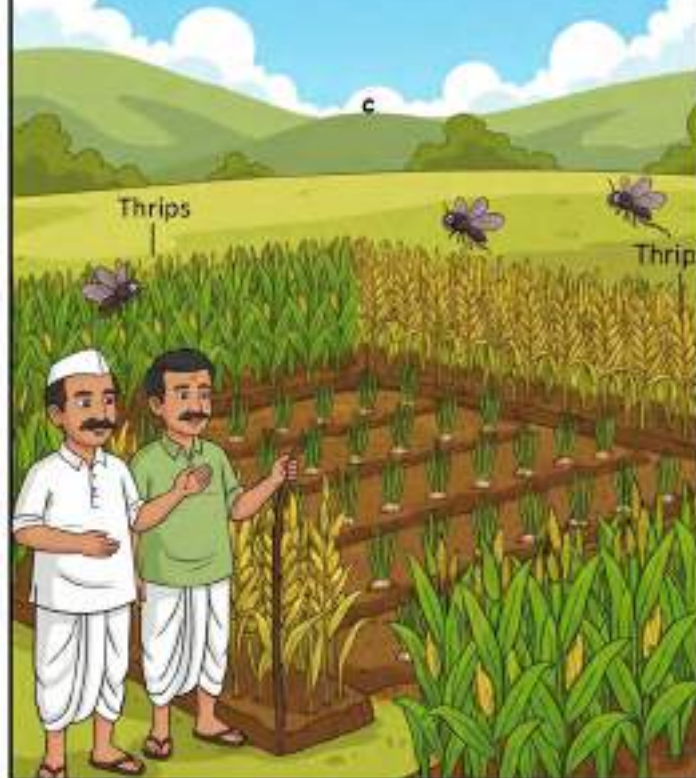


Dr. Kale: Adequate irrigation should be provided to the crop, this helps to reduce thrips population

Dr. Kale: Place 10 to 15 yellow sticky traps per acre. Thrips and other sucking pests get attracted to the yellow colour and get stuck on the traps. It's a simple and effective way to reduce their numbers.



Dr. Kale: Plant 2 rows of maize or one outer row of maize and one inner row of wheat as barrier crop surrounding onion crop.



Dr. Kale: For controlling the common cutworm, you can install pheromone traps at the rate of 10 to 12 per hectare and remember — the lures should be replaced every two to three weeks for best results.



Dr. Kale: Light traps 2-3 traps/ ha at 15 cm above the crop canopy should be fixed in the field



Dr. Kale: Spray insecticides when thrips population crosses the ETL of 30 thrips/plant



Dr. Kale: To control thrips in the field, spray insecticides like Profenofos (0.1%), carbosulfan (0.2%) or fipronil (0.1%), cyantraniliprole 10% OD @ 0.09 % depending upon the severity of infestation



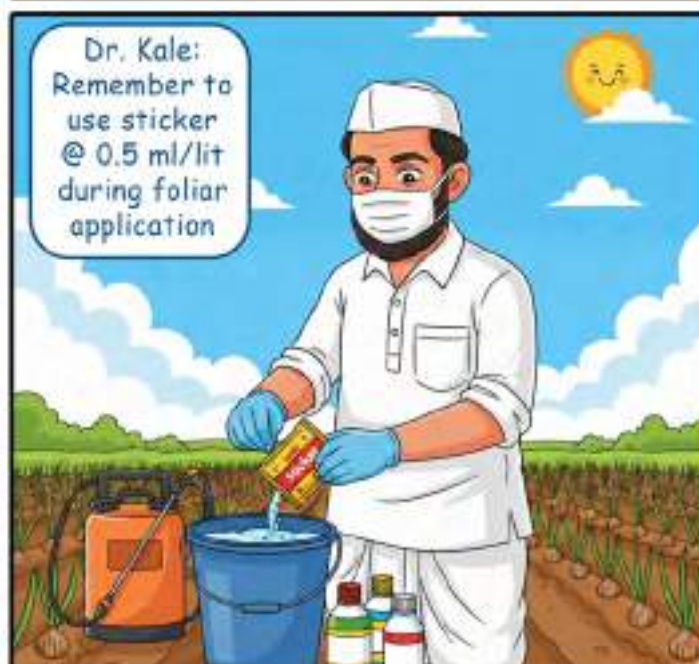
Dr. Kale: For the control of common cutworm, spray chlorantraniliprole 18.5% SC @ 0.15 ml/lit or spinosad 45% SC @ 0.12 ml/lit or chloropyrifos @ 2ml/l or quinalphos @ 1.2 ml/l or spray of NSKE 5% is also found to be promising.



Dr. Kale: For the control of red spider mite and eriophyid mite spray Dicofol (2ml/lit) or take foliar spray of sulphur @ 0.5 g/lit



Dr. Kale: Remember to use sticker @ 0.5 ml/lit during foliar application



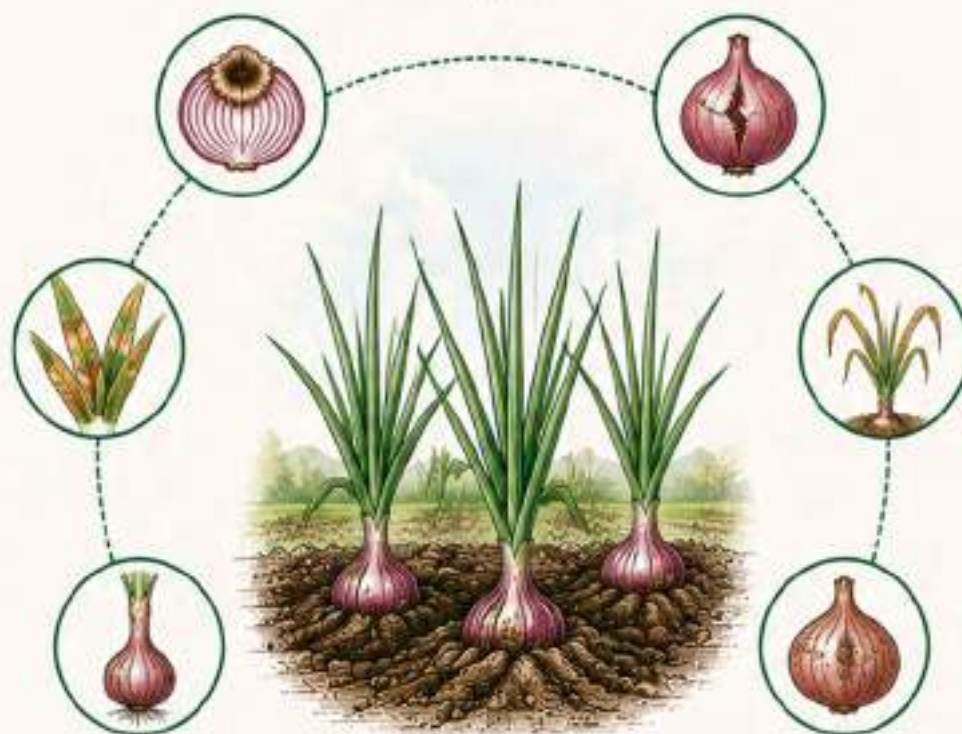


• STORY 7 •

Hidden Onion Troubles



Physiological Disorder Management





Early morning, the sun rises over onion fields as farmers tie bundles, weigh harvests, and dry onions for curing, filling the village with hope for a good harvest



Baba, if we handle the onions carefully now, we'll get a better price in the market, right?

Yes, Shubham. Good care in the field and after harvest always brings good returns

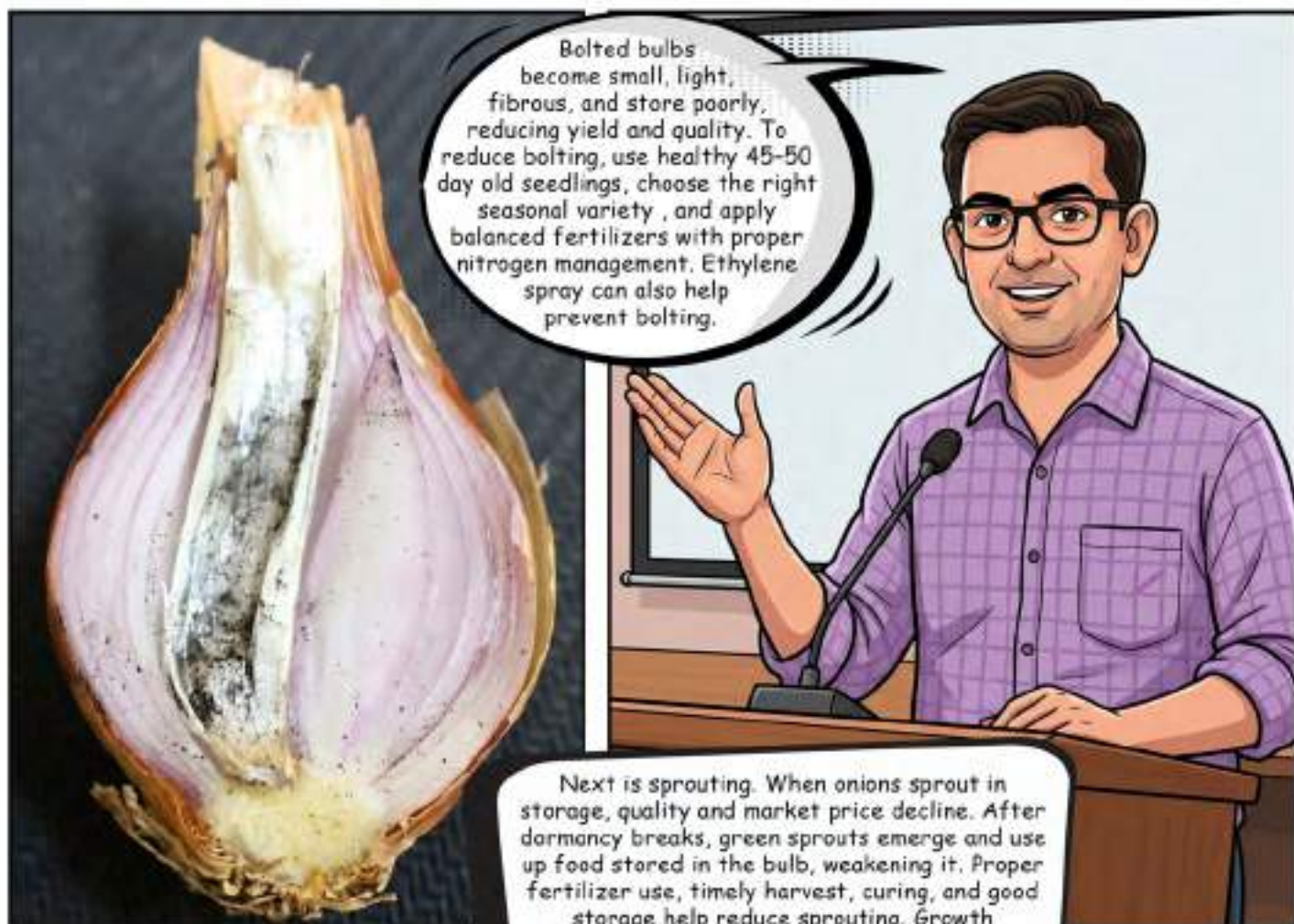












Next is sprouting. When onions sprout in storage, quality and market price decline. After dormancy breaks, green sprouts emerge and use up food stored in the bulb, weakening it. Proper fertilizer use, timely harvest, curing, and good storage help reduce sprouting. Growth regulators like 1-MCP and ethylene can also help.





Dr. Pranjali: This happens when one plant forms more than one bulb from the same root. It can be caused by variety, weather, planting depth, spacing, and fertilizer use. Excess nitrogen, especially late in the season, increases bulb splitting.



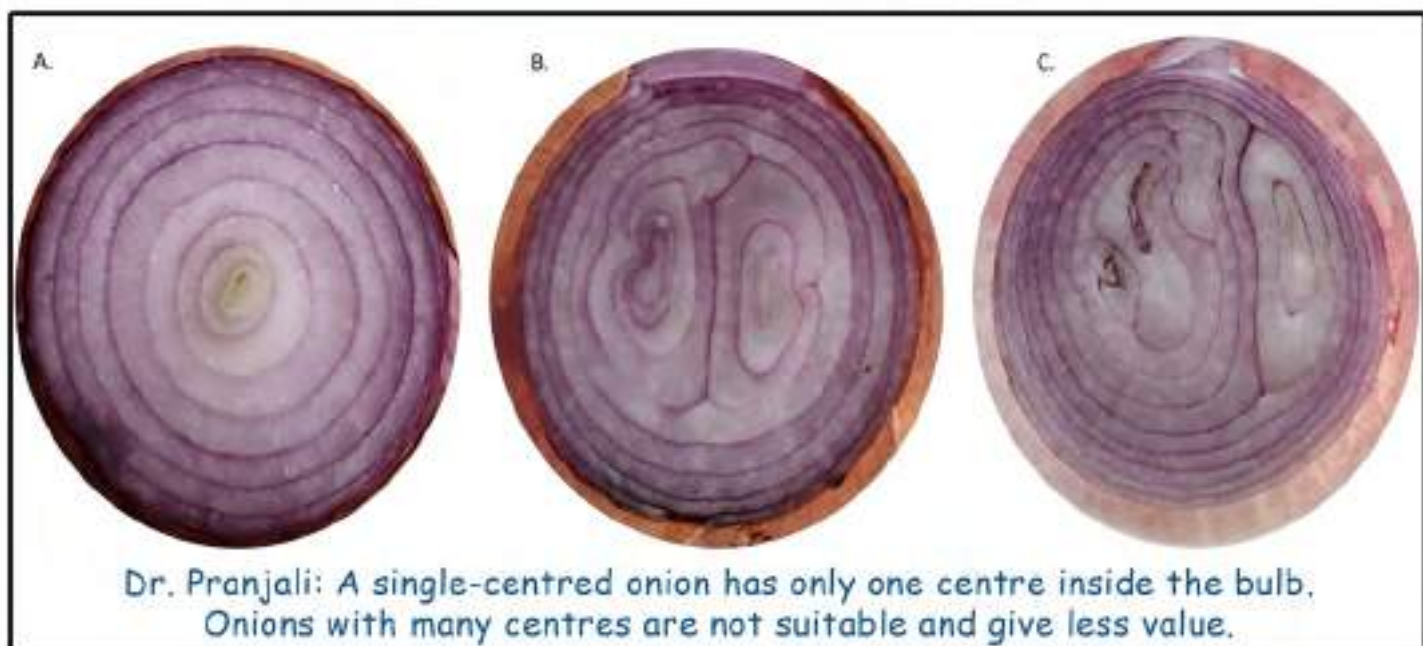
Madam, what practices should we follow to avoid the problem of double onions in our field?



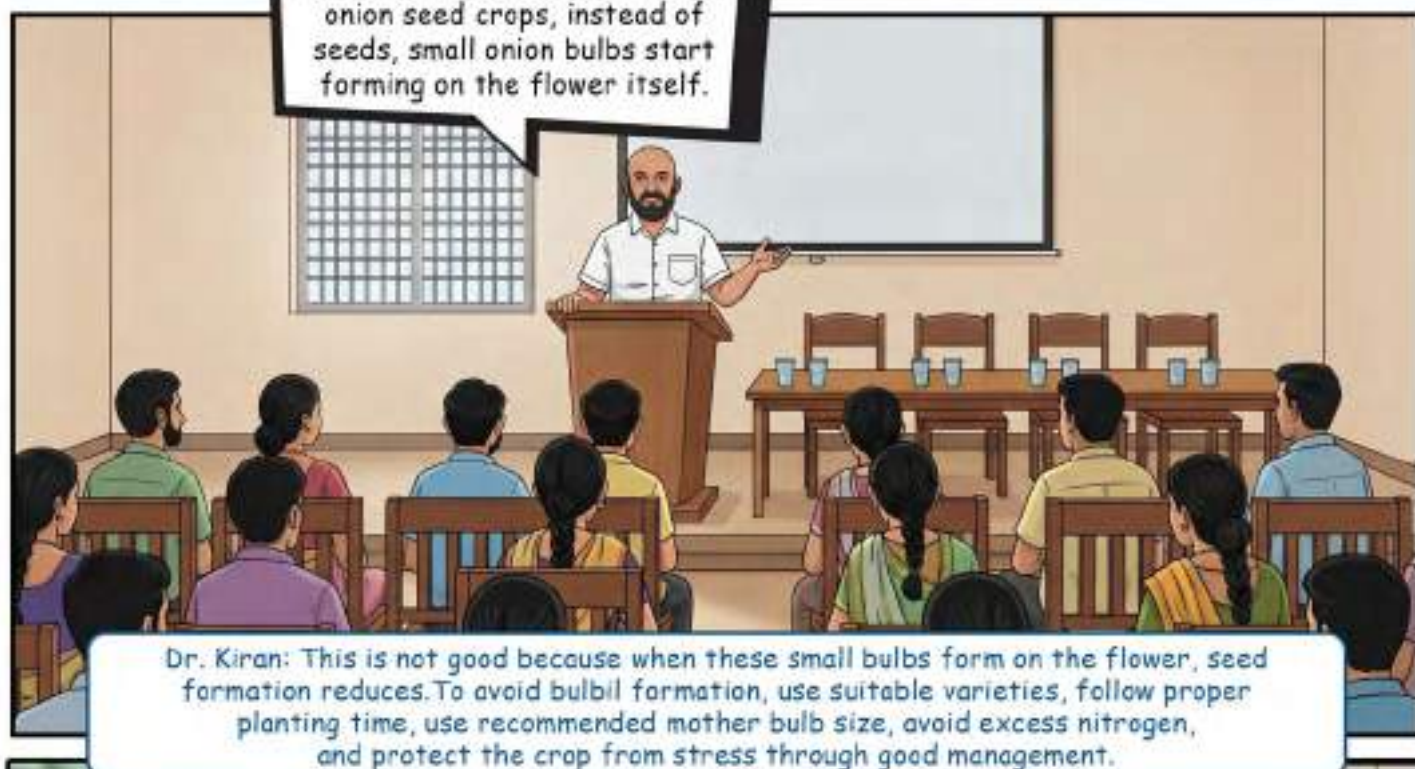
Very good question. To reduce bulb splitting, avoid excess nitrogen late in the season, use small to medium onion sets, maintain proper planting depth and spacing, and prevent bulb injury during field operations.



Now let us understand the next condition—internal doubles or multi-centred onions



Dr. Pranjali: A single-centred onion has only one centre inside the bulb. Onions with many centres are not suitable and give less value.





Dr. Kiran: In this disorder, onion scales become soft, watery or leathery during storage, mainly due to poor ventilation. When CO_2 builds up and oxygen is low, bulbs get stressed and watery scale develops, especially in poorly ventilated storage.

To reduce watery or leathery scale, maintain good ventilation, proper temperature and humidity, avoid sealed storage and carbon dioxide buildup, and handle bulbs carefully to prevent injury.





STORY 8

Your Smart Farming Companion



Onion Crop Advisor Application



Dattabhau is looking worried standing in his onion field. The crop does not look healthy—some plants have turned yellow and some are wilted.



Why is my crop failing again this season?



Dr. Kale visits Dattabhau's field, shows him a smartphone app, and Dattabhau looks on curiously but unsure.



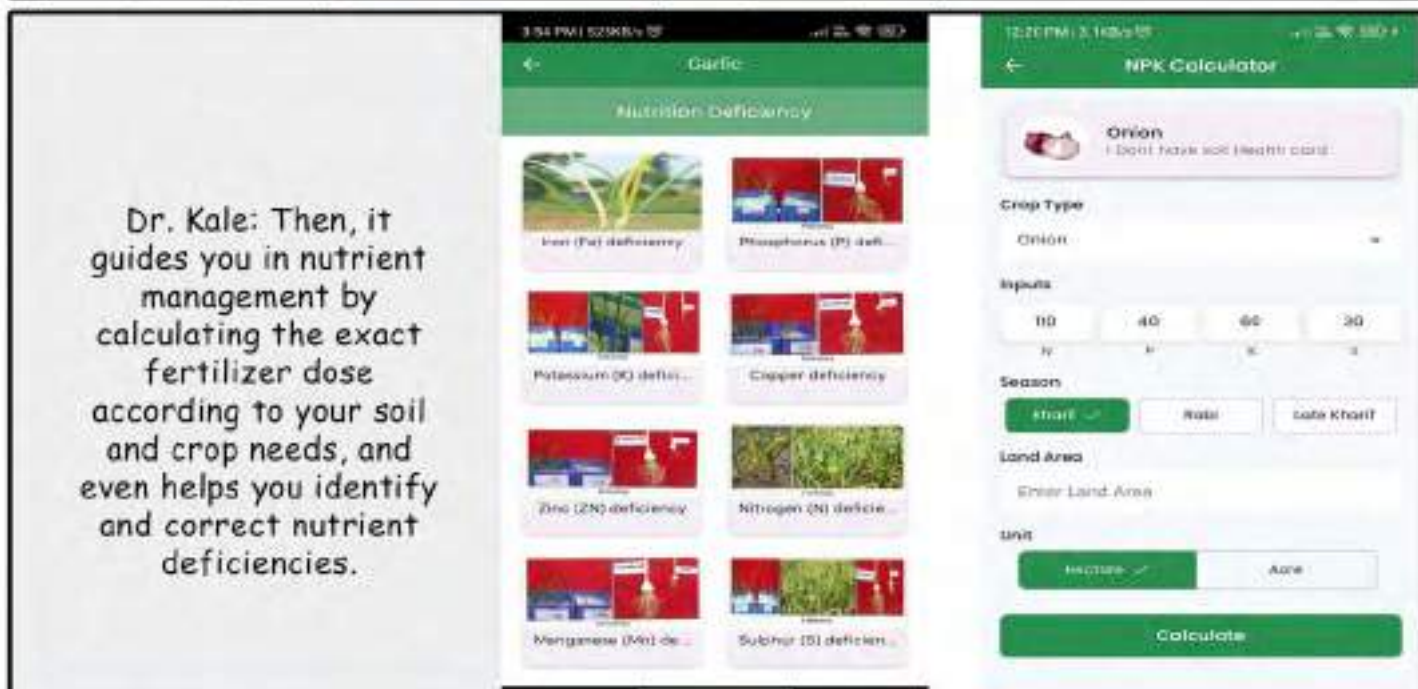
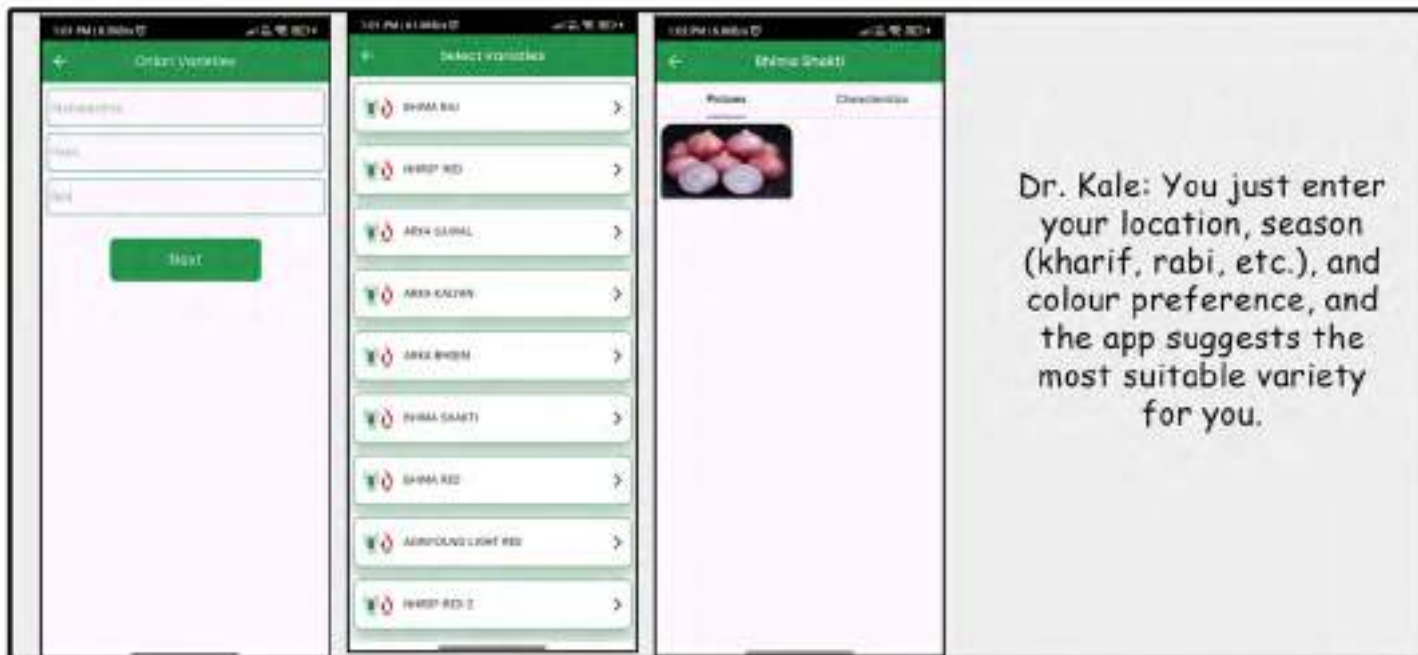
Dattabhau ji, I have something that can help you! our institute has developed Onion Crop Advisor and Garlic Crop Advisor Apps. These apps will guide you step-by-step using Decision Support Systems.

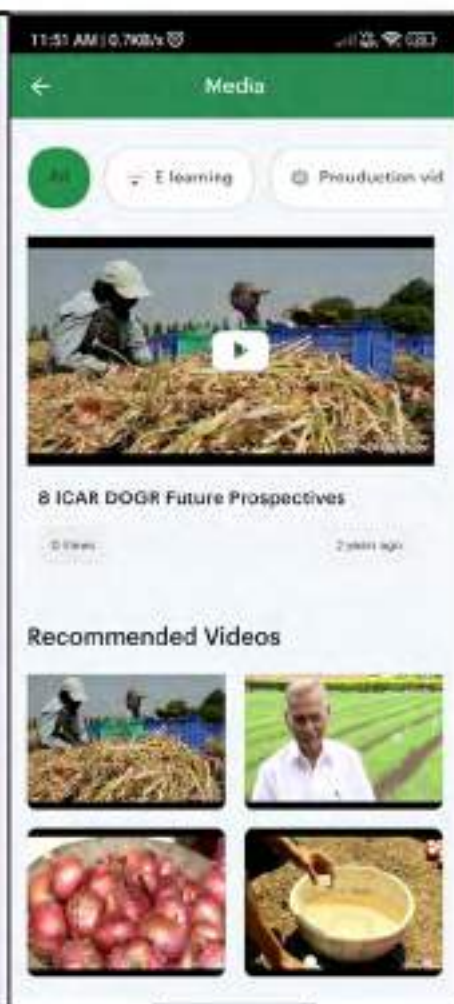
Will it really help me make better decisions?

Yes, of course!









It also gives a personalized crop calendar with day-to-day guidance—from land preparation, sowing, irrigation and fertigation to harvesting—along with advice on weed and post-harvest management, market rates, and useful videos and blogs for better understanding.



• STORY 9 •

Saving the Harvest



Storage of Onion



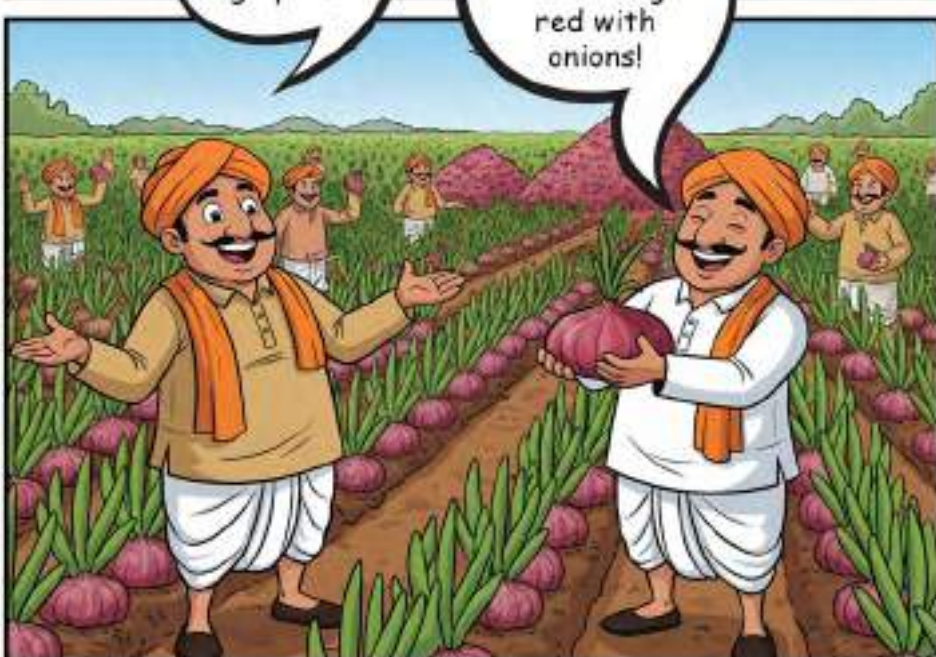


This year, the farmer has achieved a lush onion field showcasing a bumper harvest, filled with vigorous, uniformly healthy, fully grown onion

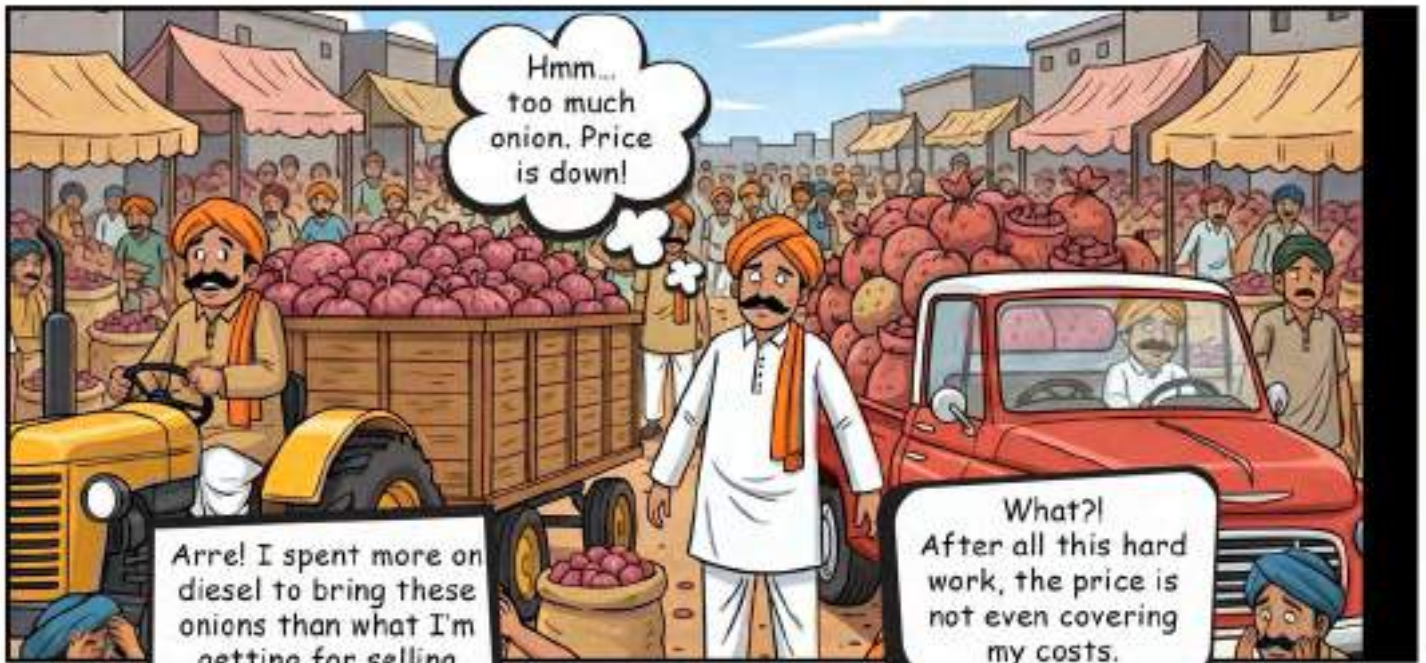


This season, we will get huge profit

Look at this! My field is shining red with onions!







Hmm... too much onion. Price is down!

Arre! I spent more on diesel to bring these onions than what I'm getting for selling them!

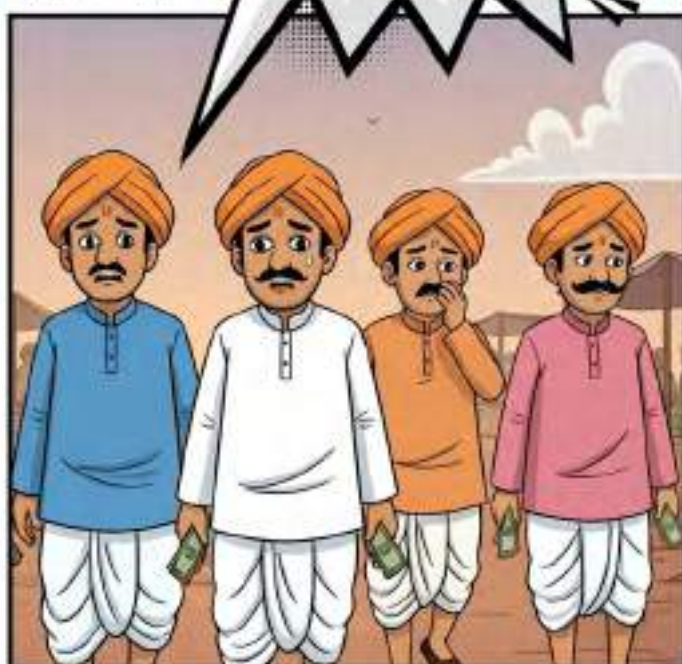
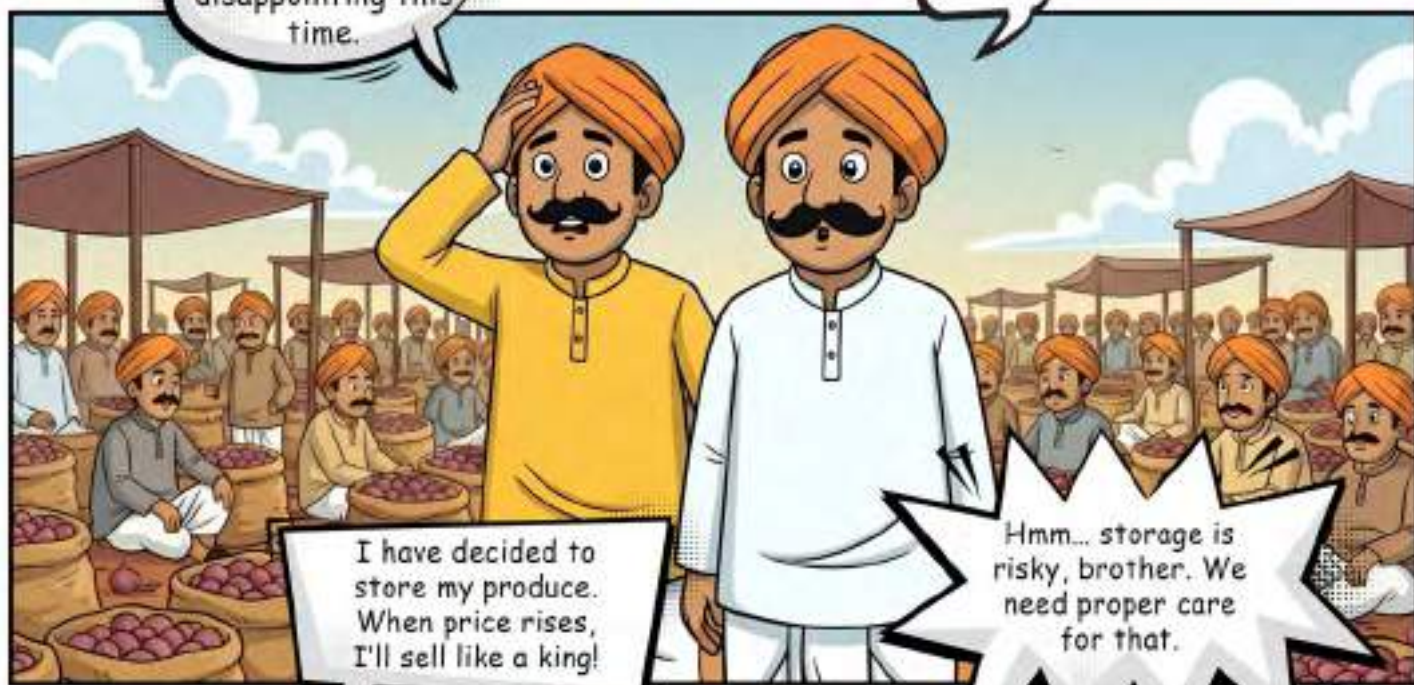
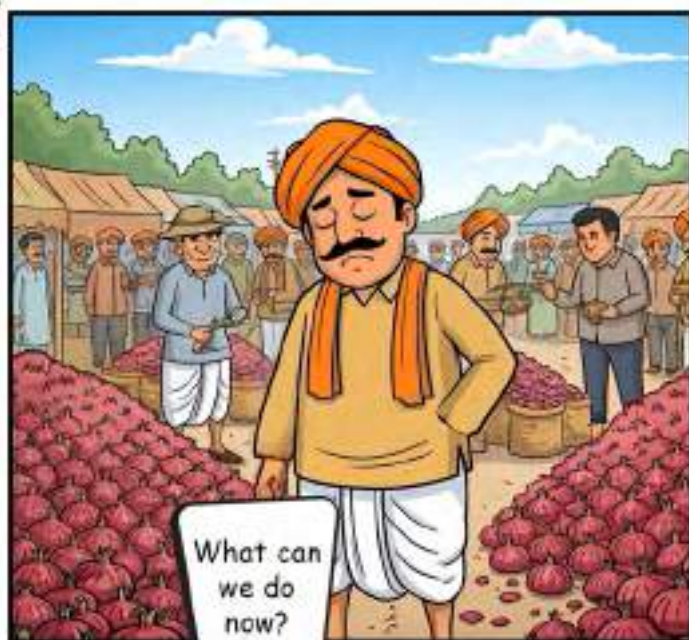
What?! After all this hard work, the price is not even covering my costs.

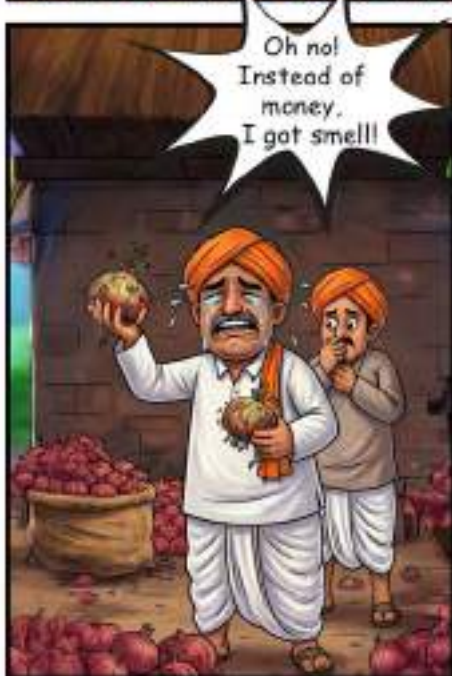
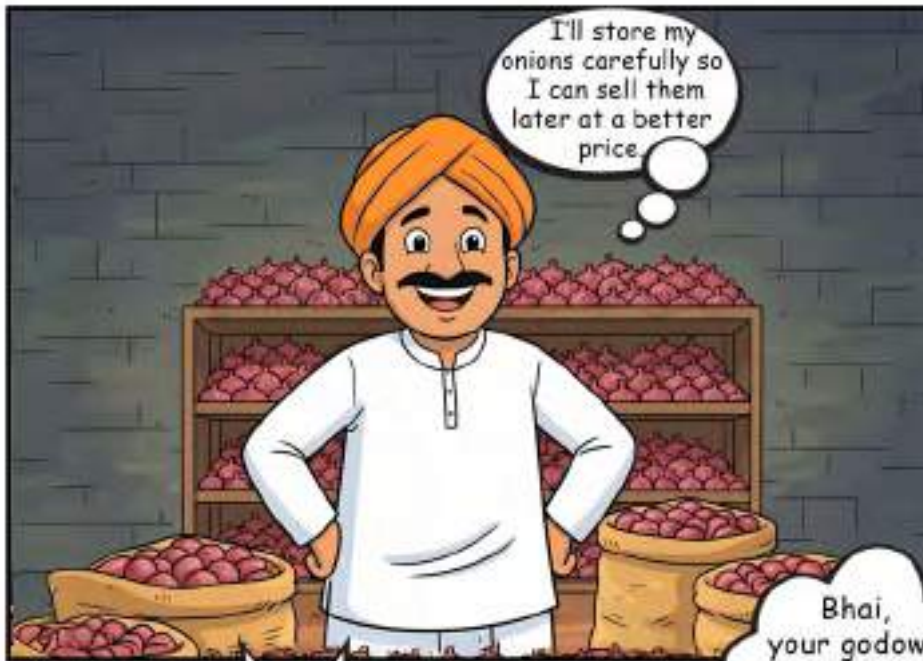


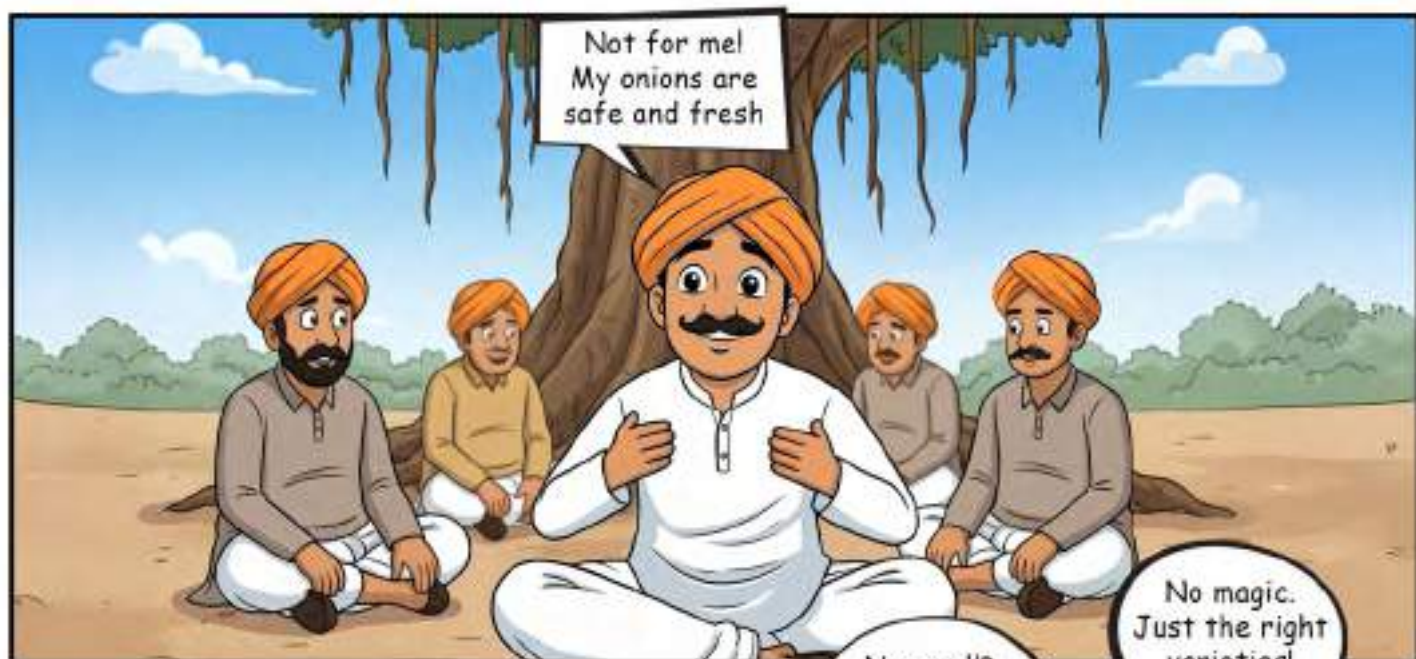
Hmm... too much onion. Price is down!

Oh no... prices have crashed! What will we do now?

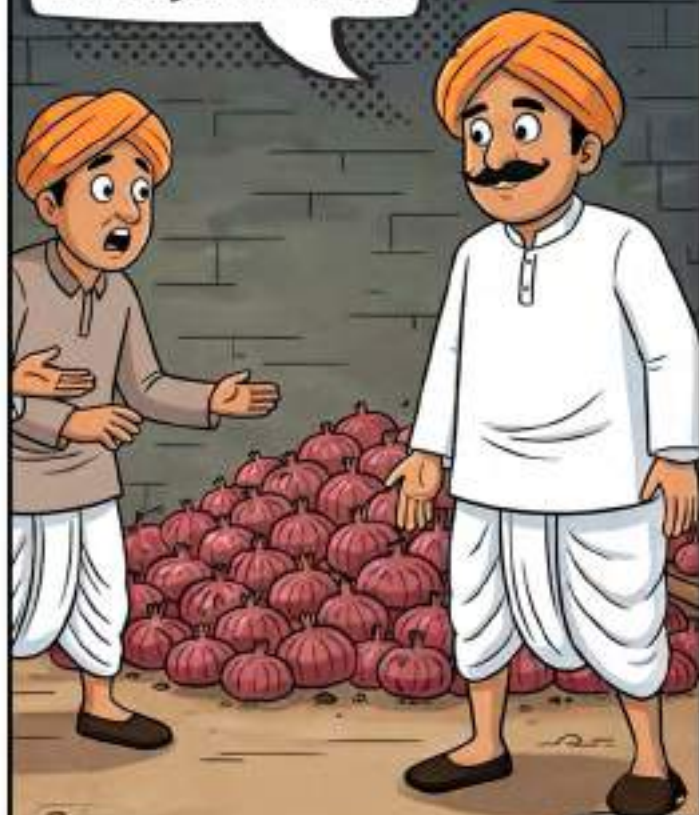




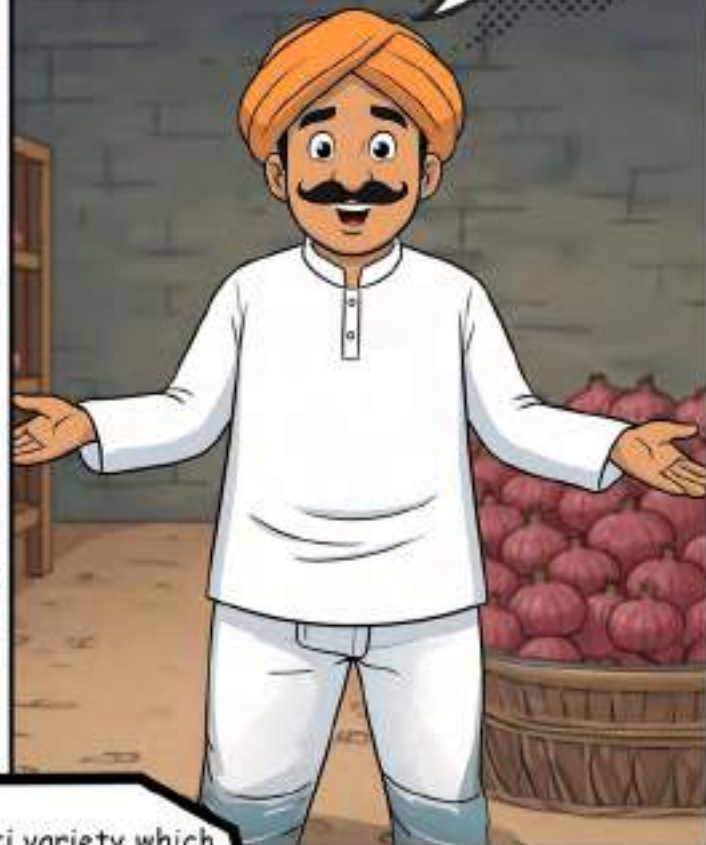




It is the premier research institute dedicated to the onion and garlic crop, developing and recommending suitable technologies for farmers



They recommend 3 varieties which are having excellent storage capacity

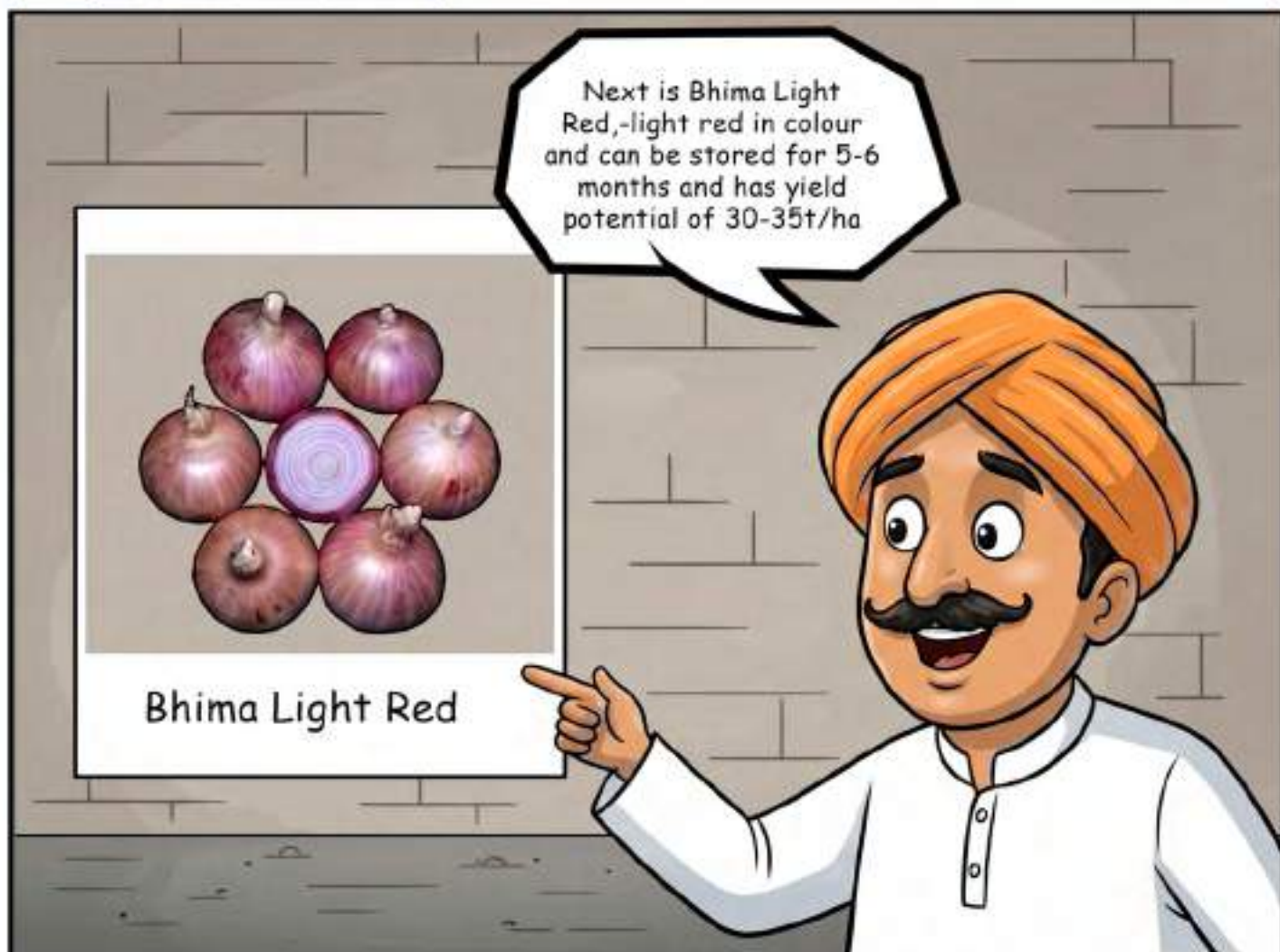


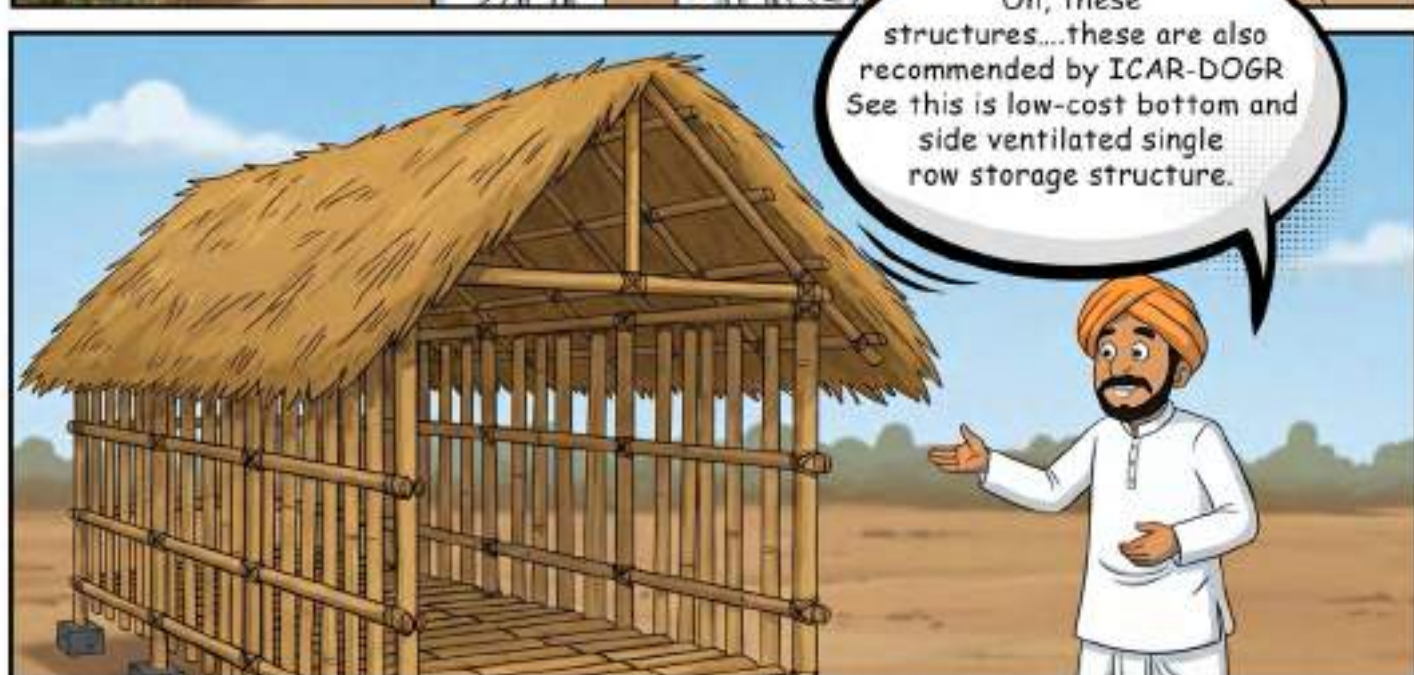
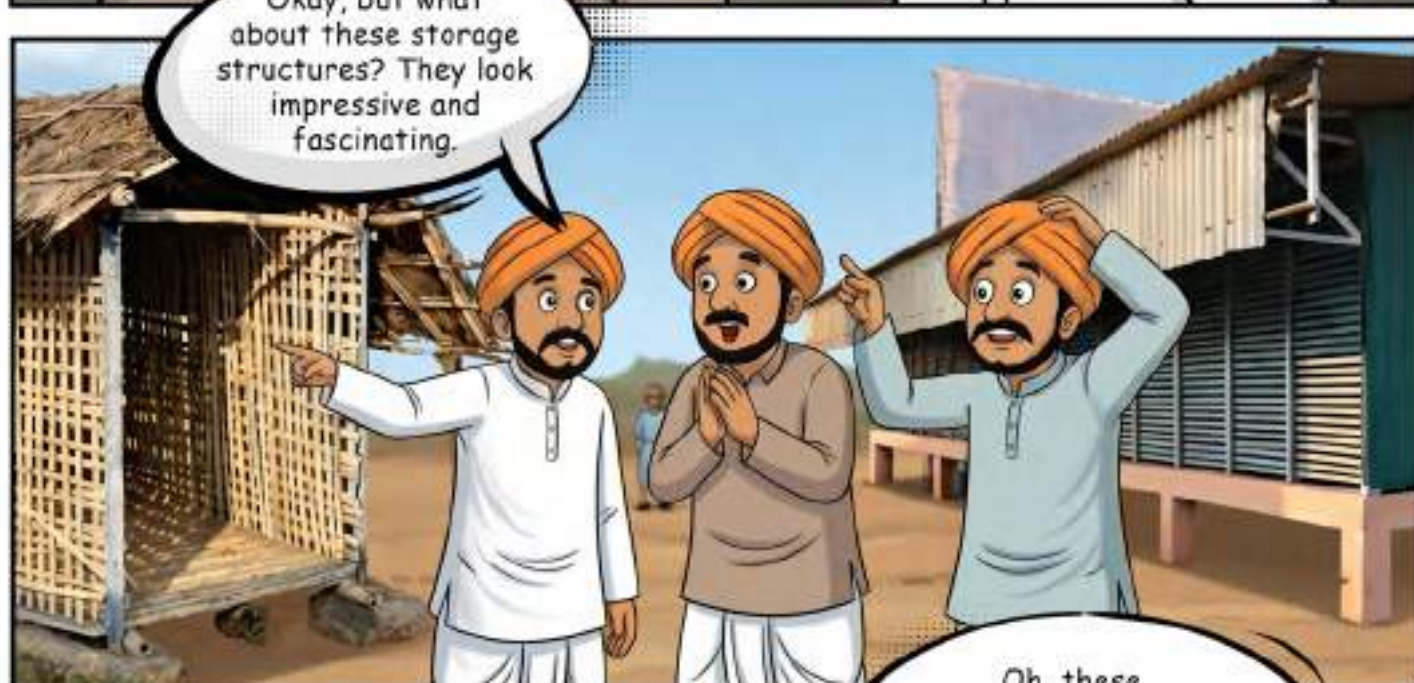
Bhima Shakti variety which is red in colour can be stored for 5-6 months and it also has 40-45t/ha yield potential



Bhima Shakti







Guidelines recommended by the Directorate of Onion and Garlic Research
for a single-row storage structure

Description	5 ton capacity	10 ton capacity
Direction of Shed Construction	North-South	North-South
Length (ft)	15	30
Width (ft)	4	8
Side Wall Height (ft)	5	5
Height at the Center (ft)	7.5	7.5
Roof Length (ft)	6	6
Height of Raised Floor Above Ground (ft)	1	1
Storage Capacity (m ³)	10	16
Storage Capacity (in Tons)	5	10
Expected Lifespan (Years)	20	20
Shed Construction Materials		
Roof	Mangalore Tiles or Cement Sheets	
Side Walls	Bamboo / Solid Wooden Planks	

And for building the single row storage structure you have to follow these guidelines



And this is a naturally ventilated, improved double row storage structure



To construct it, you need to follow these guidelines.

And for building it you have to follow these guidelines

Description	25 ton capacity	50 ton capacity
Direction of Shed Construction	East-West	East-West
Length (ft)	40	80
Width (ft)	12	12
Side Wall Height (ft)	6	6
Height at the Center (ft)	10	10
Central Passage Width (ft)	4	4
Height of Raised Floor Above Ground (ft)	1	1
Storage Capacity (m ³)	42	84
Storage Capacity (ton)	25	50
Expected Lifespan (Years)	20	20
Shed Construction Materials		
Roof	Cement Sheets / G.I. Sheets	
Side Walls	Bamboo / Solid Wooden Slats	
Raised Floor	Bamboo / Solid Wooden Slats	
Foundation	R.C.C. Pillars / Columns	



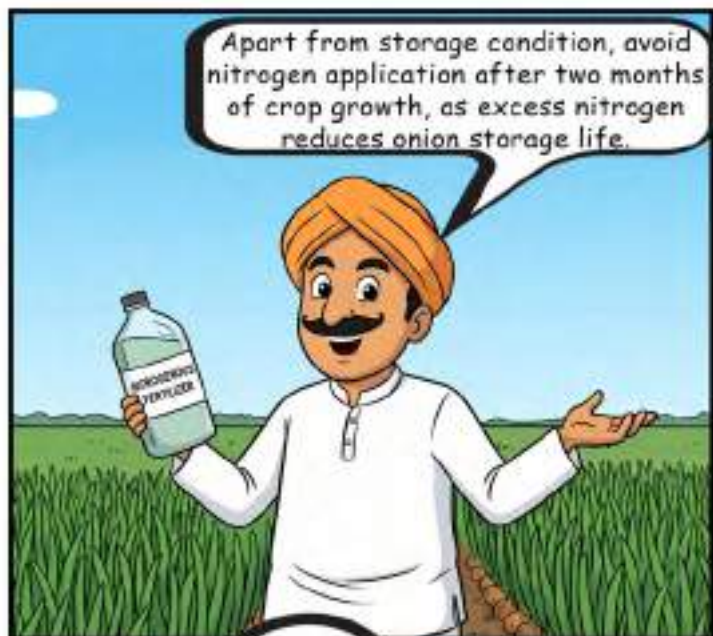
So, these structures actually keep our onions safe for months

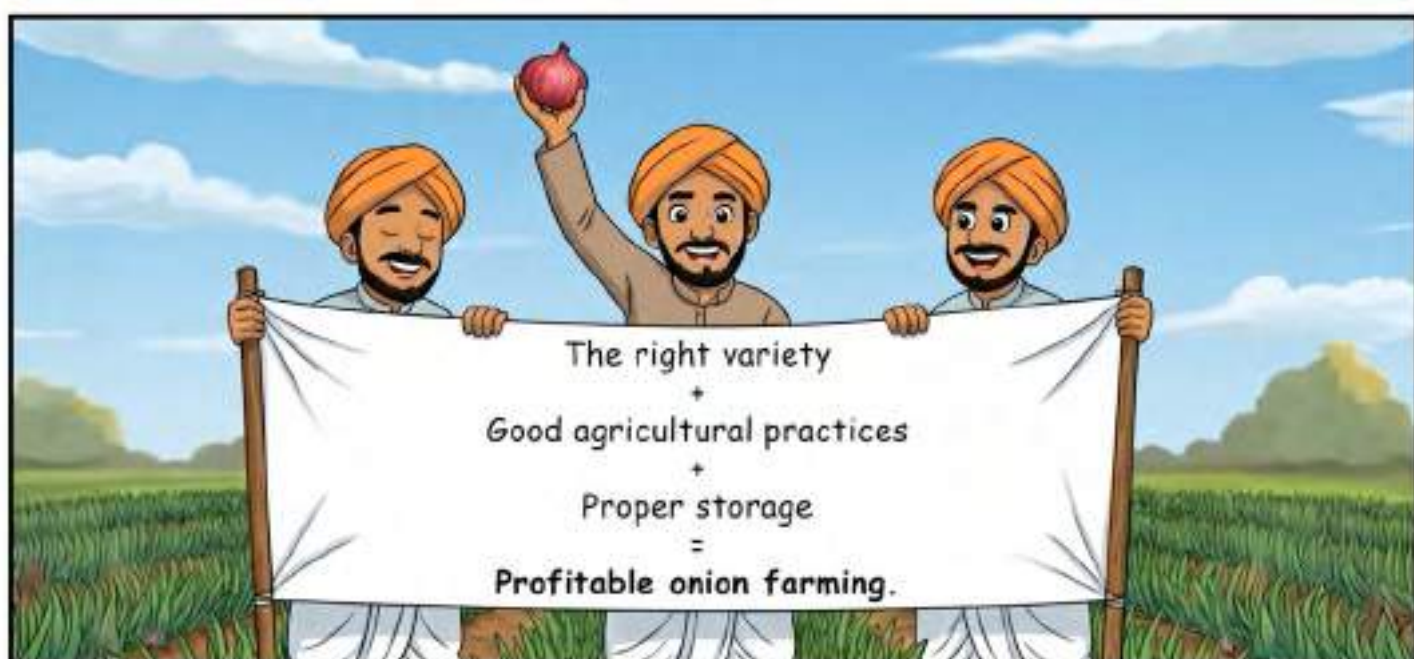
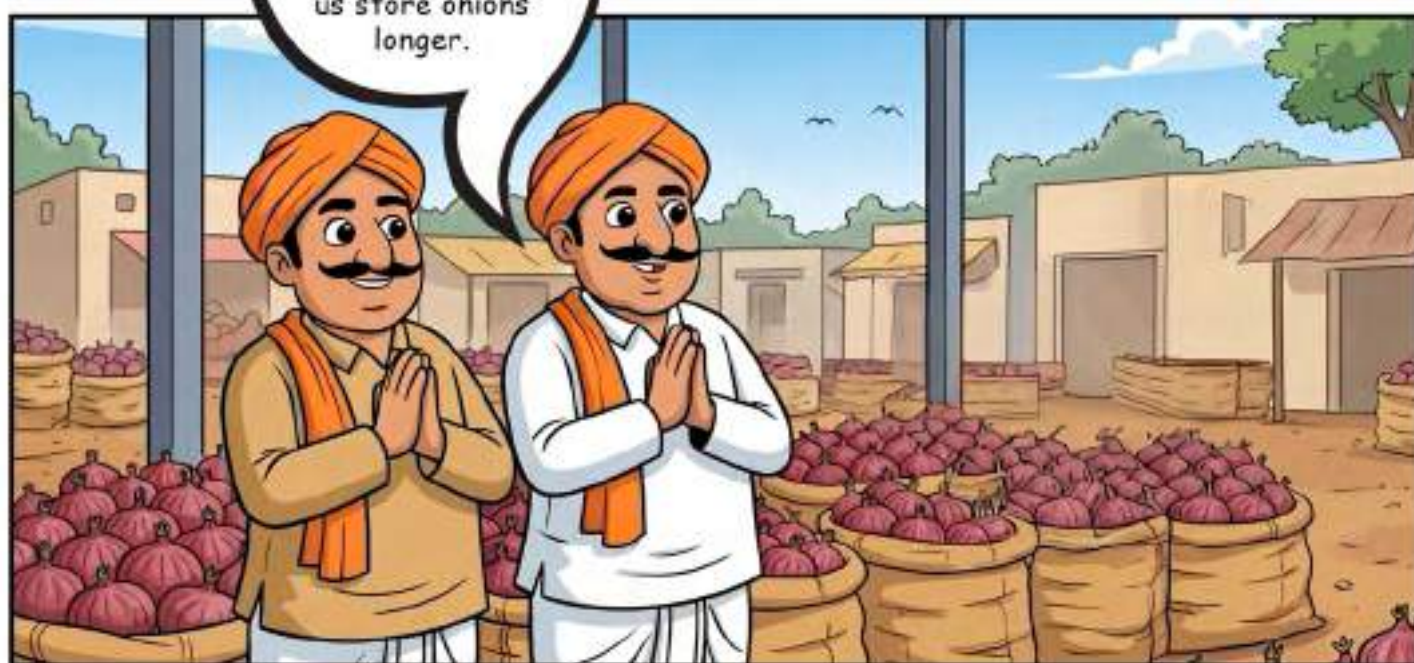
Oh, but these will cost a lot

Don't worry government gives 50% subsidy under onion storage

Next season I will build one in my farm, no more crying





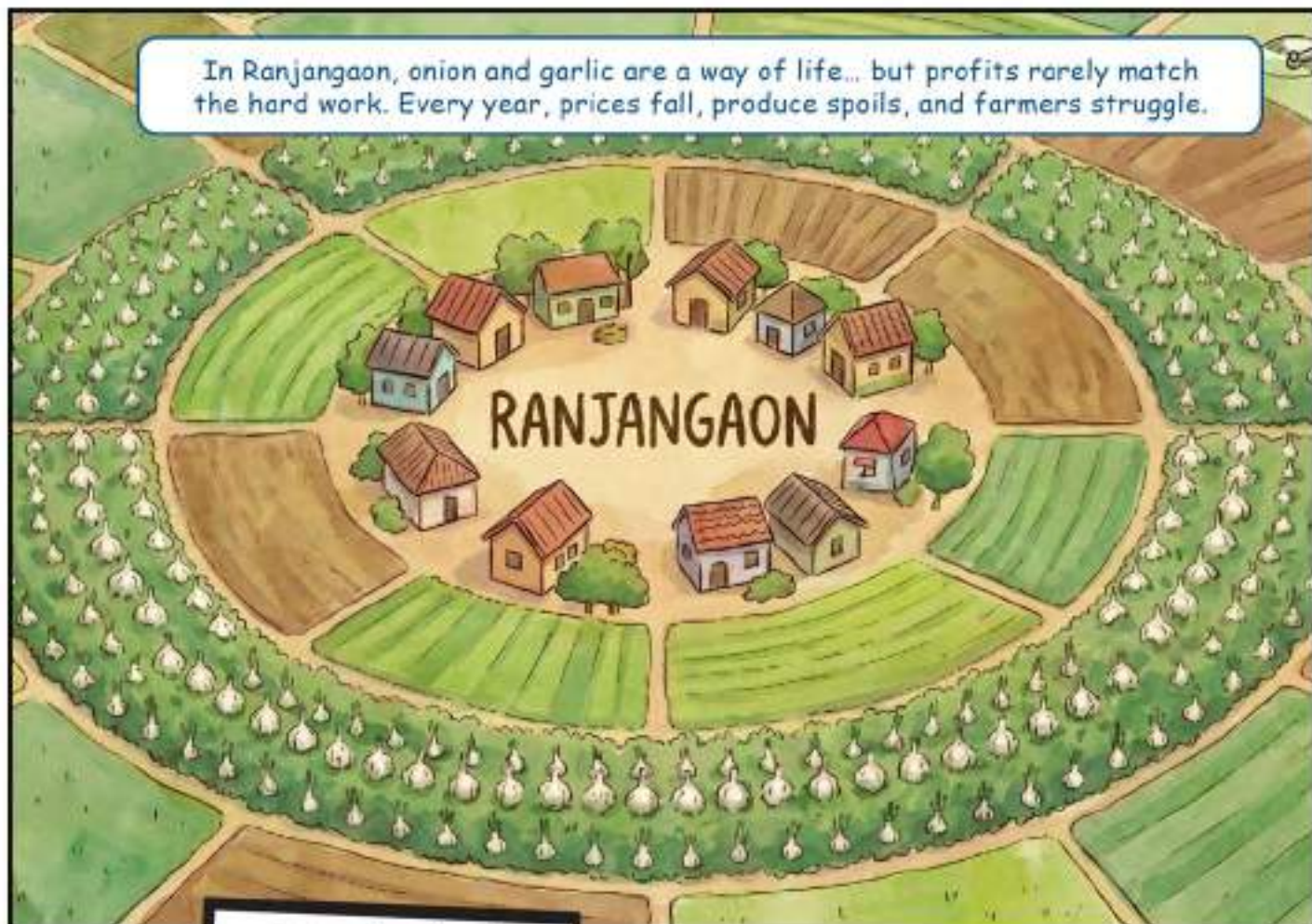


Where Ideas **Grow** into Agribusiness

Agribusiness Incubation Center



In Ranjangaon, onion and garlic are a way of life... but profits rarely match the hard work. Every year, prices fall, produce spoils, and farmers struggle.



Attention please!
A Farmers' Fair will be
held tomorrow in the
nearby village! All
farmers are requested
to attend



We should
go to
the Kisan
Mela





Selection Process for Incubation

Inviting applications for incubation

Submission of duly filled registration form

Review by the advisory committee members

Submission of DPRs by the applicant

Review & approval for incubation

Deposition of fees

Signing of Memorandum of Understanding (MoU)

Joining of the incubate at ABI centre, ICAR-DOGR

It's very simple to become an incubatee at the ABI Centre of ICAR-DOGR—just apply, submit your form, get it reviewed, and once approved, complete the formalities to start your journey.

This is our Custom Hiring Centre (CHC), where you can use processing machinery on a hiring basis without heavy investment. Now we will learn different value added products of onion and garlic products from Dr. Kalyani and Dr. Bhushan.



Dr. Bhushan: Processing and value addition in onion and garlic reduce losses and protect farmers from price fluctuations. Converting onion into Flakes, powder, or paste increases shelf life and income, while creating opportunities for farmers, SHGs, and rural entrepreneurs in domestic and export markets.



First, we start with onion flakes.



First, always begin with proper selection by choosing healthy and fully mature onions to ensure good quality flakes.



Carry out cleaning and peeling by removing the outer dry skin and washing the onions thoroughly.





Dr. Bhushan: Drying is done in a hot air dryer at around 55-60°C until all the moisture is removed. Once the slices are completely dried, break them into flakes.

Namaste!
I am Dr. Kalyani. I'll
train you in garlic
paste preparation

Finally, pack the flakes in airtight containers to
maintain their quality and increase their shelf life.

**AIR-TIGHT
ONION FLAKES**
Dried & Preserved

**ONION PRESERVATION
& PACKAGING**



Take high-quality,
mature garlic bulbs,
break them into
individual cloves and
thoroughly de-skin.

Cleaned cloves are washed, then crushed into a smooth paste in a paste making machine. Add 0.1% SO_2 , 15% salt, and 0.05% ascorbic acid, mix well, and apply mild heat to stabilize.

Finally, vacuum pack the paste to remove oxygen, prevent spoilage, and store it in a cool place.

We never knew small steps could make such a big difference.

By converting produce into flakes, powder, paste, or black garlic, farmers can increase shelf life and income.





Custom Hiring Centre



Custom Hiring Centre (CHC) comprises a set of farm implements, and equipment for custom hiring to entrepreneurs and farmers for farm mechanization and post-harvest processing.

Objectives :

- To make farm machinery available to farmers or entrepreneurs on a rental basis.
- To expand mechanization in onion & garlic crop.

Machineries available at CHC



Slicer Machine

Charges Rs. 25 / hr



Paste Making Machine

Charges Rs. 10 / hr



Bucket Centrifuge Machine

Charges Rs. 10 / hr



Cooking Vati

Charges Rs. 15 / hr



Hot Air Dryer

Charges Rs. 60 / hr



Powder Making Machine

Charges Rs. 10 / hr



Garlic Peeling Machine

Charges Rs. 1 / hr



Packaging Machine

Charges Rs. 40 / hr



Agricultural Dryer

Charges Rs. 100 / day



Seed Germinator

Charges Rs. 500 / season



Seed Grader

Charges Rs. 500 / hr

Agri-Business Incubation Centre

Farm Machinery & Equipment for On-farm Processing

Onion Grading Machine



- Grading based on size for uniform quality
- Improved market value and reduces labour

Onion Peeling Machine



- Efficient peeling with high capacity
- Saves time and reduces drudgery

Onion Slicer



- Uniform slicing for value addition
- Suitable for dehydration and other products

Dehydrator (Tray Dryer)



- Reduces moisture content for longer shelf life
- Ideal for onion, garlic and other produce

Garlic Separator



- Separates cloves from bulbs efficiently
- Saves time and manual effort

Vacuum Packing Machine



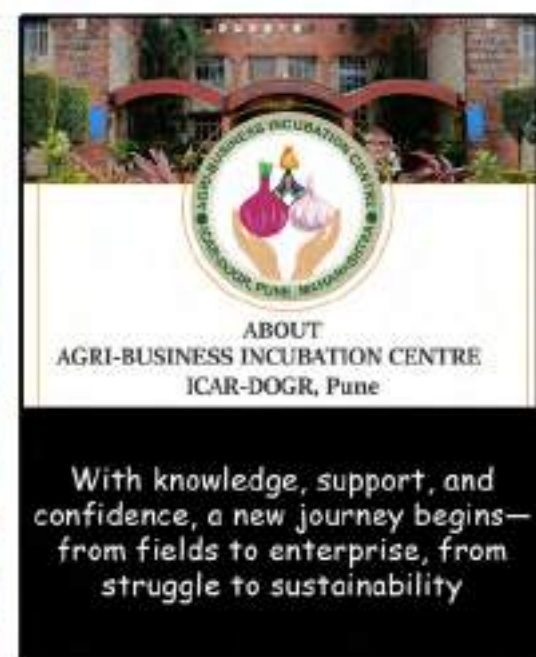
- Increases shelf life and preserves quality
- Enhances market opportunities

Our Goal: Supporting Agri-Entrepreneurs with Right Tools, Technology and Training for Sustainable Growth





Yes.
We rent the available machinery for processing, packaging, and value addition.



STORY 11

Powering Innovation & Technology Transfer

Intellectual Technology Management Unit



At Agri-Seed Solutions, every day begins with a commitment to better farming. Together, our team works to deliver quality seeds that help farmers grow stronger harvests and brighter futures.

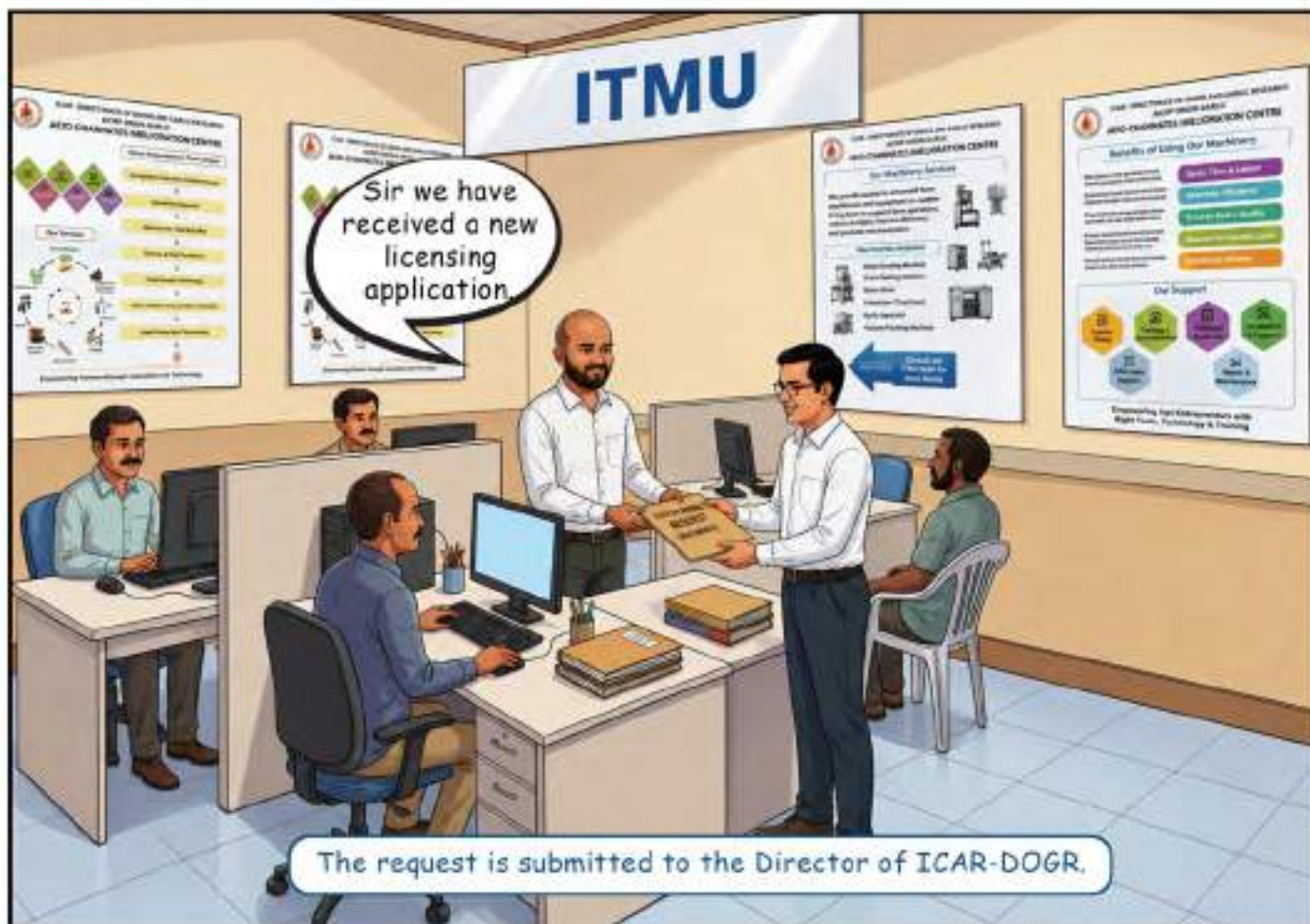
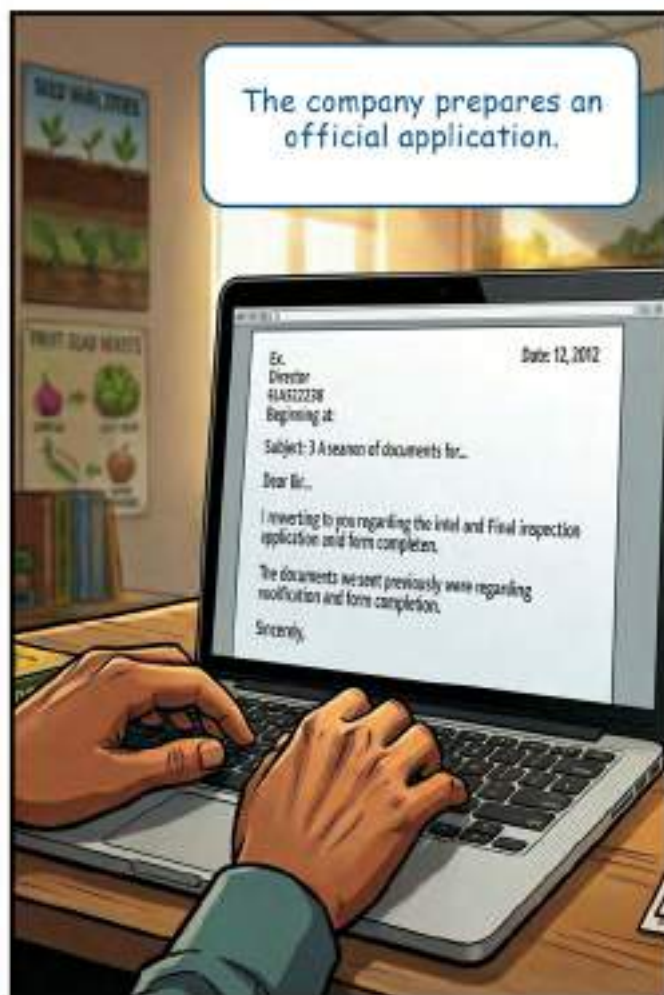
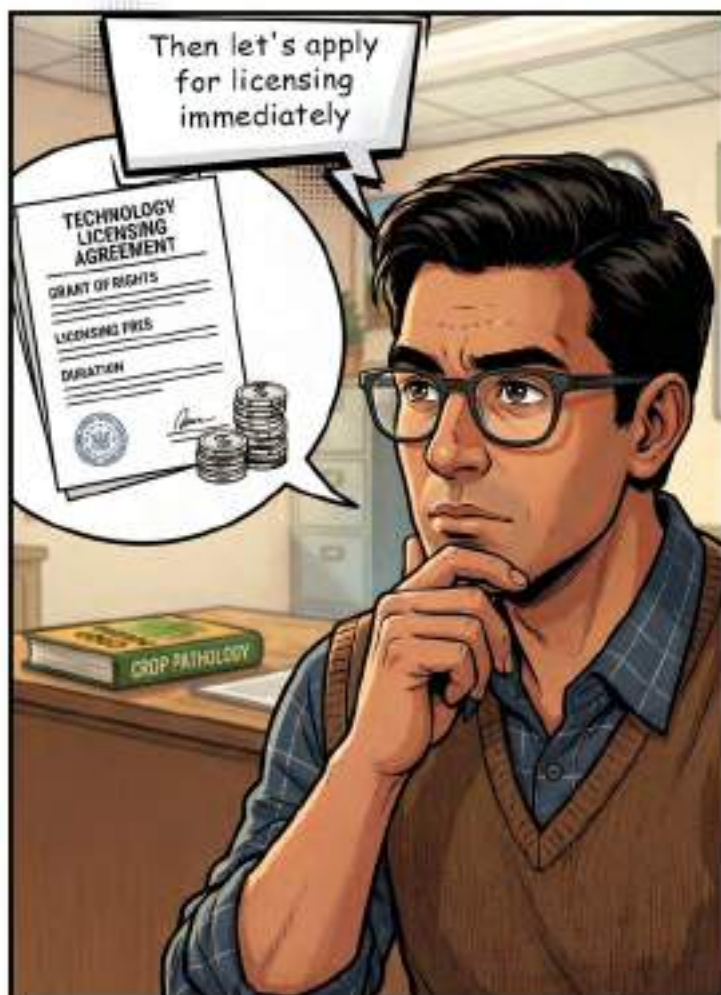
ICAR-DOGR has developed excellent onion varieties... If we get a license, we can produce and sell quality seeds.



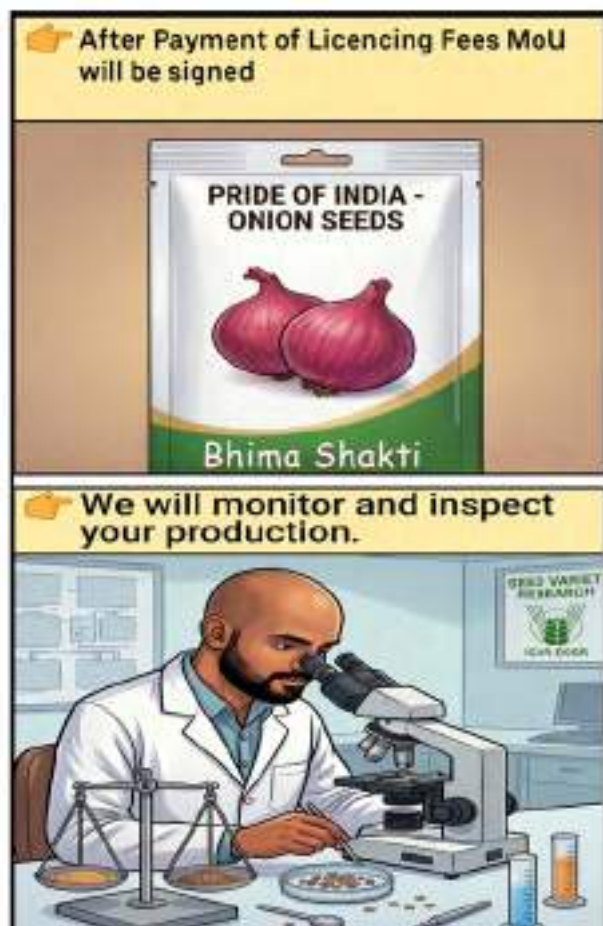
Sir, these varieties are in high demand among farmers.













• STORY 12 •

Modern Spraying Technology



Agricultural Drones



The sun rises over a small village. With hope in their hearts, farmers walk towards their fields. Like every village, the farmers here dream of healthy crops and a good harvest.



Despite regular spraying, pests and diseases are increasing. I'm worried—how can I save my crop in time?



Arre, what's that flying over the field?

Is that a drone? May be help has finally arrived.







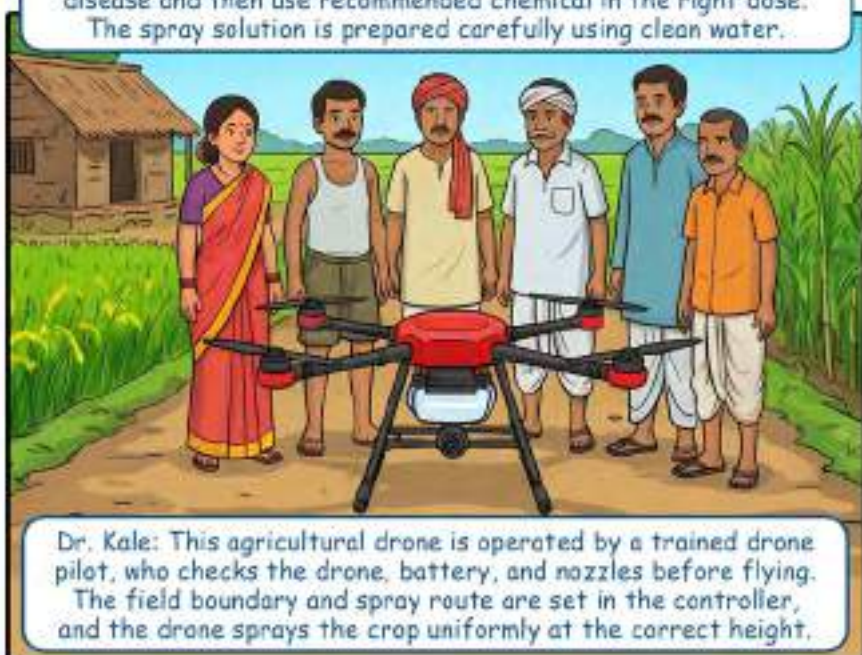


Dr. Kale: This ensures uniform spraying and avoids misuse of chemicals. Farmers remain at a safe distance during the operation. That is why drone spraying is safe, scientific, and reliable.



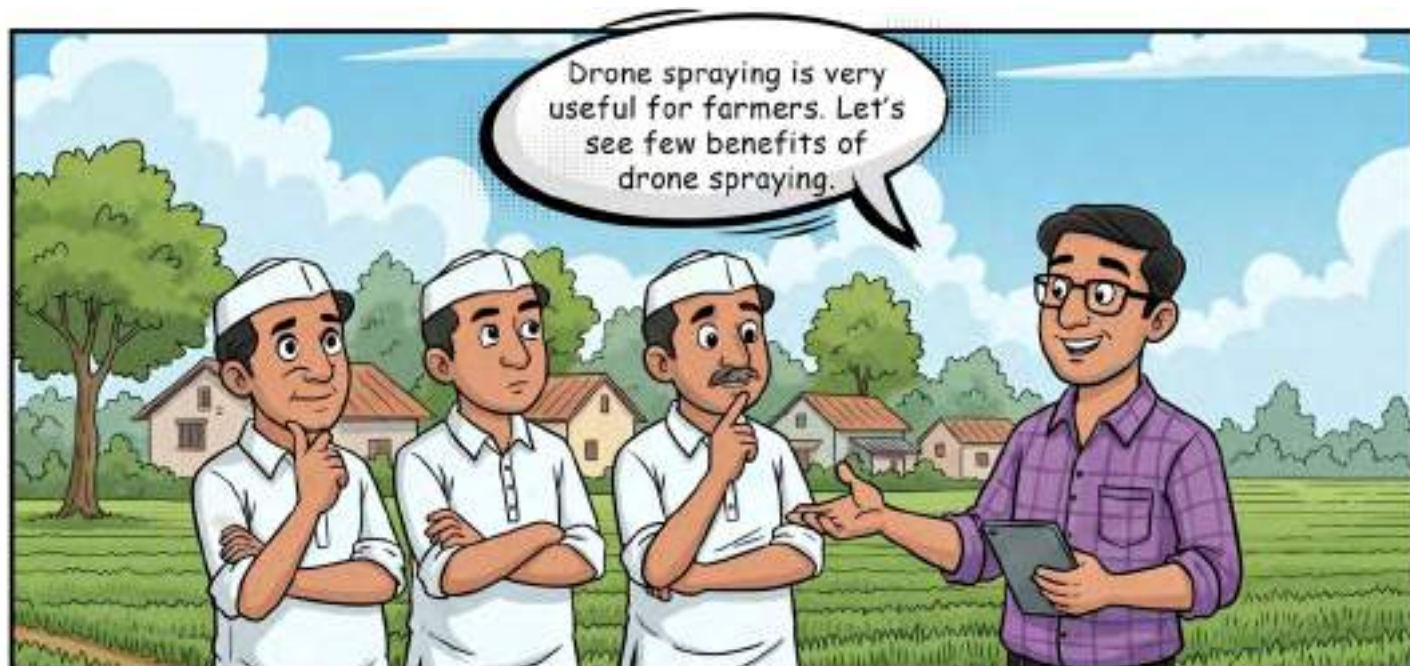
Dr. Kale: First, examine your crop to understand the pest or disease and then use recommended chemical in the right dose. The spray solution is prepared carefully using clean water.

Sir, how is drone spraying useful for us farmers?



Dr. Kale: This agricultural drone is operated by a trained drone pilot, who checks the drone, battery, and nozzles before flying. The field boundary and spray route are set in the controller, and the drone sprays the crop uniformly at the correct height.

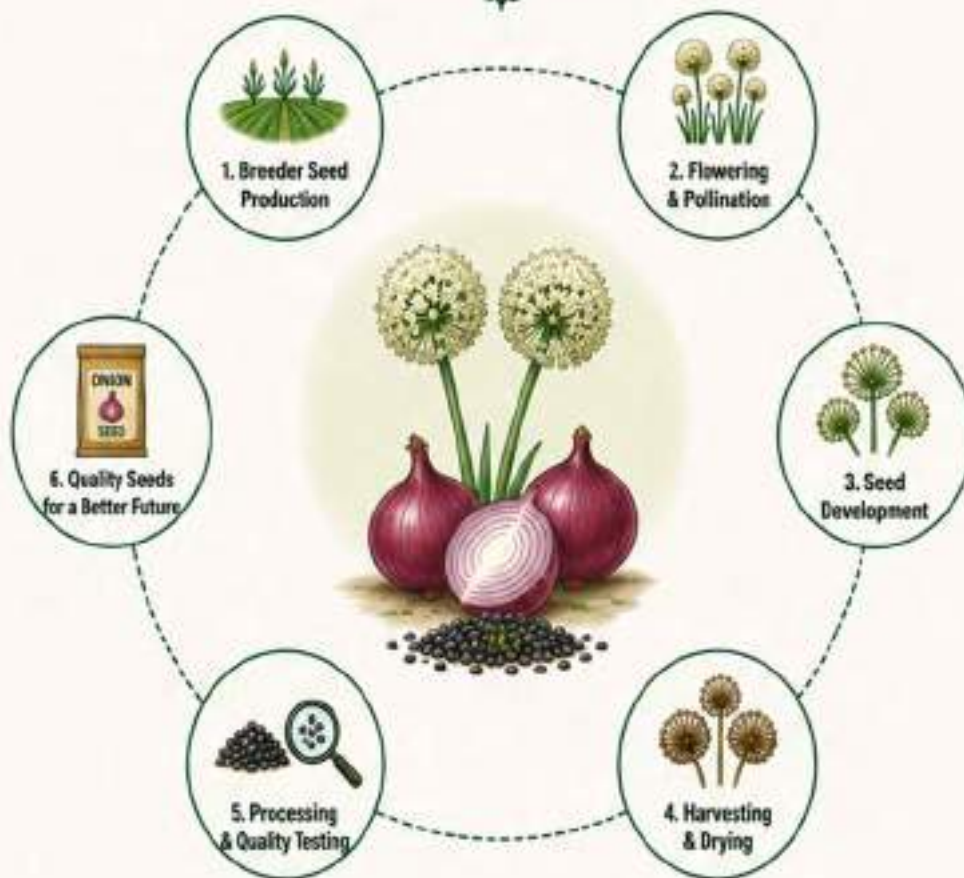


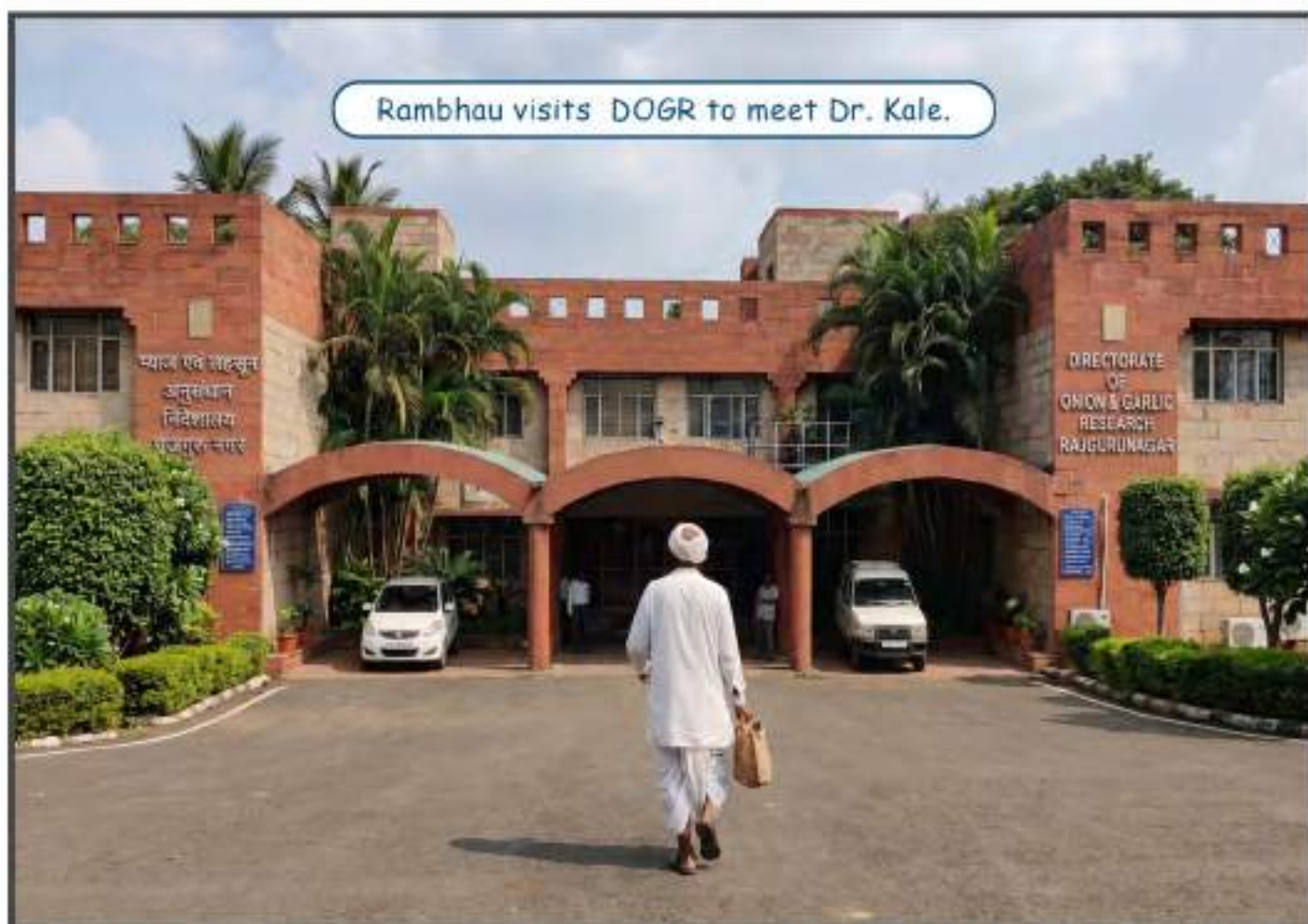
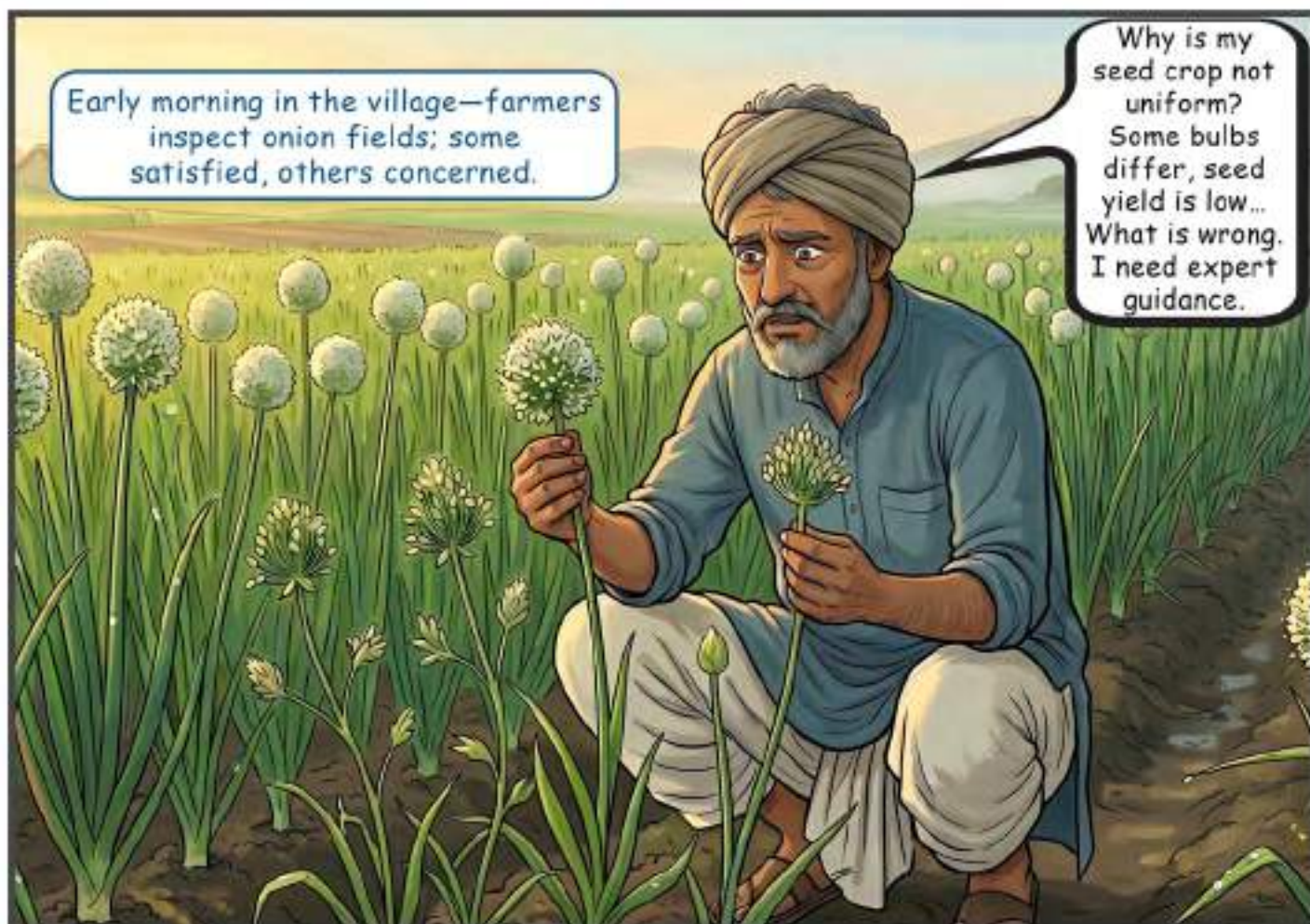


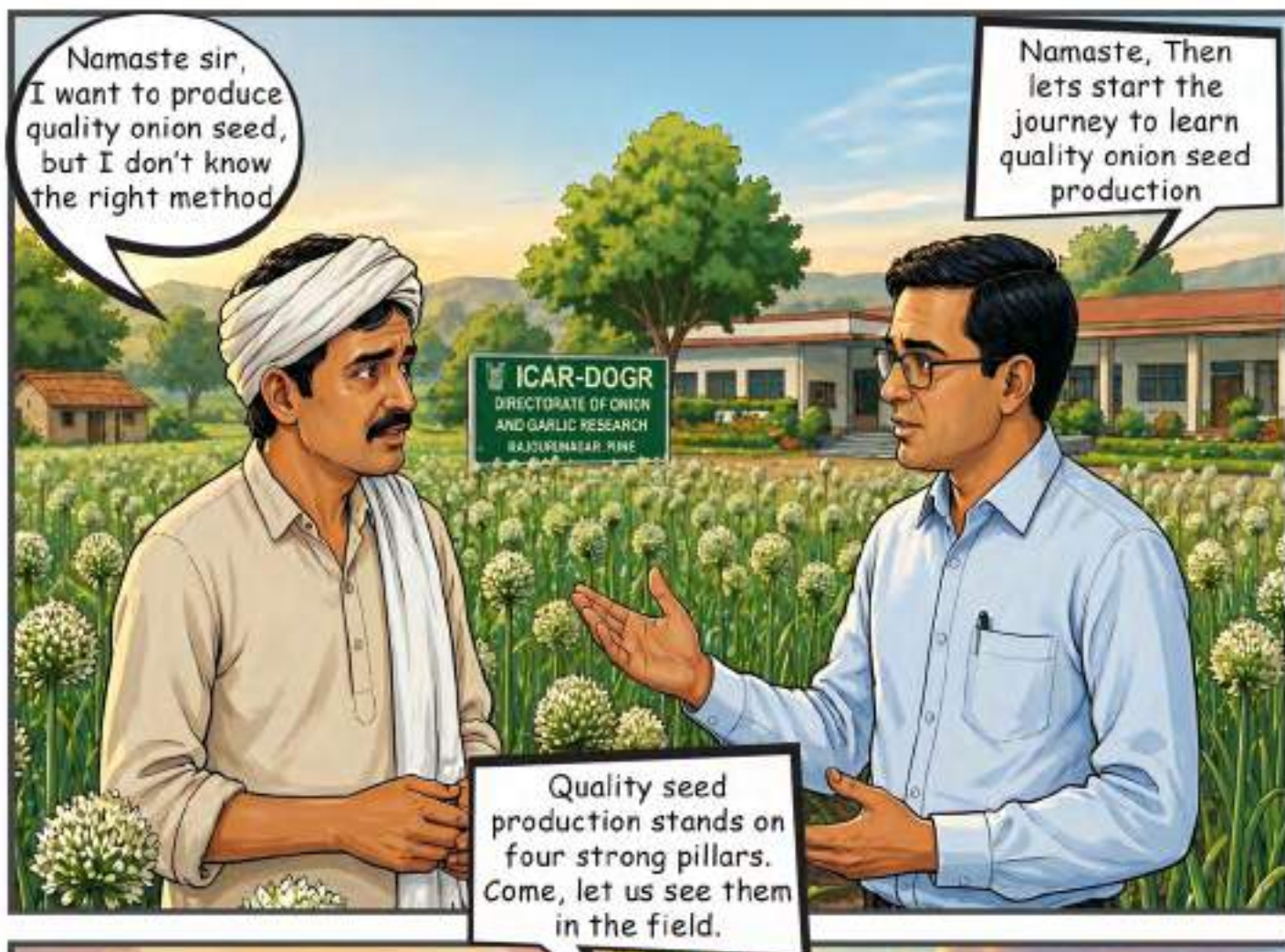
The Journey of Quality Seeds

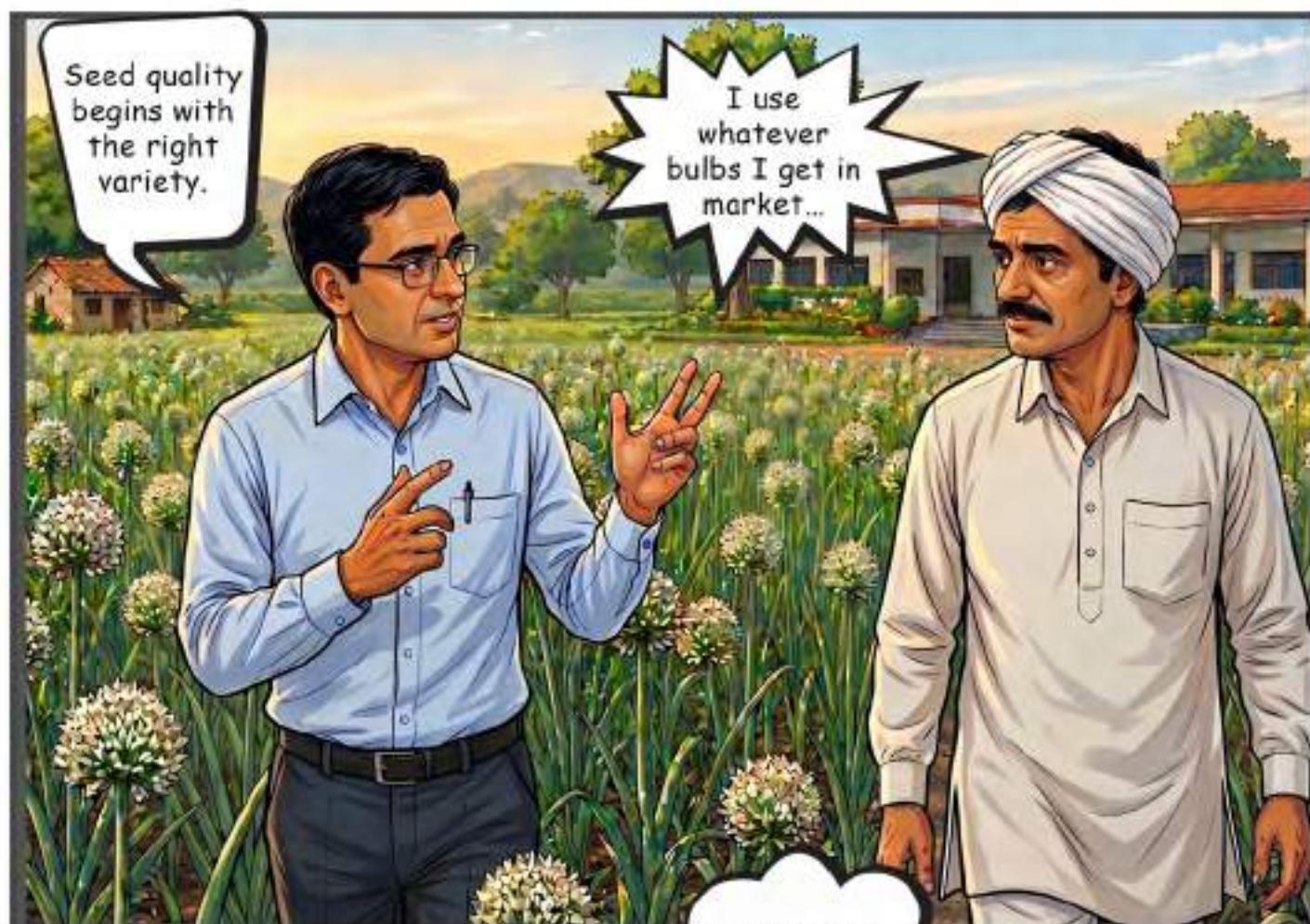


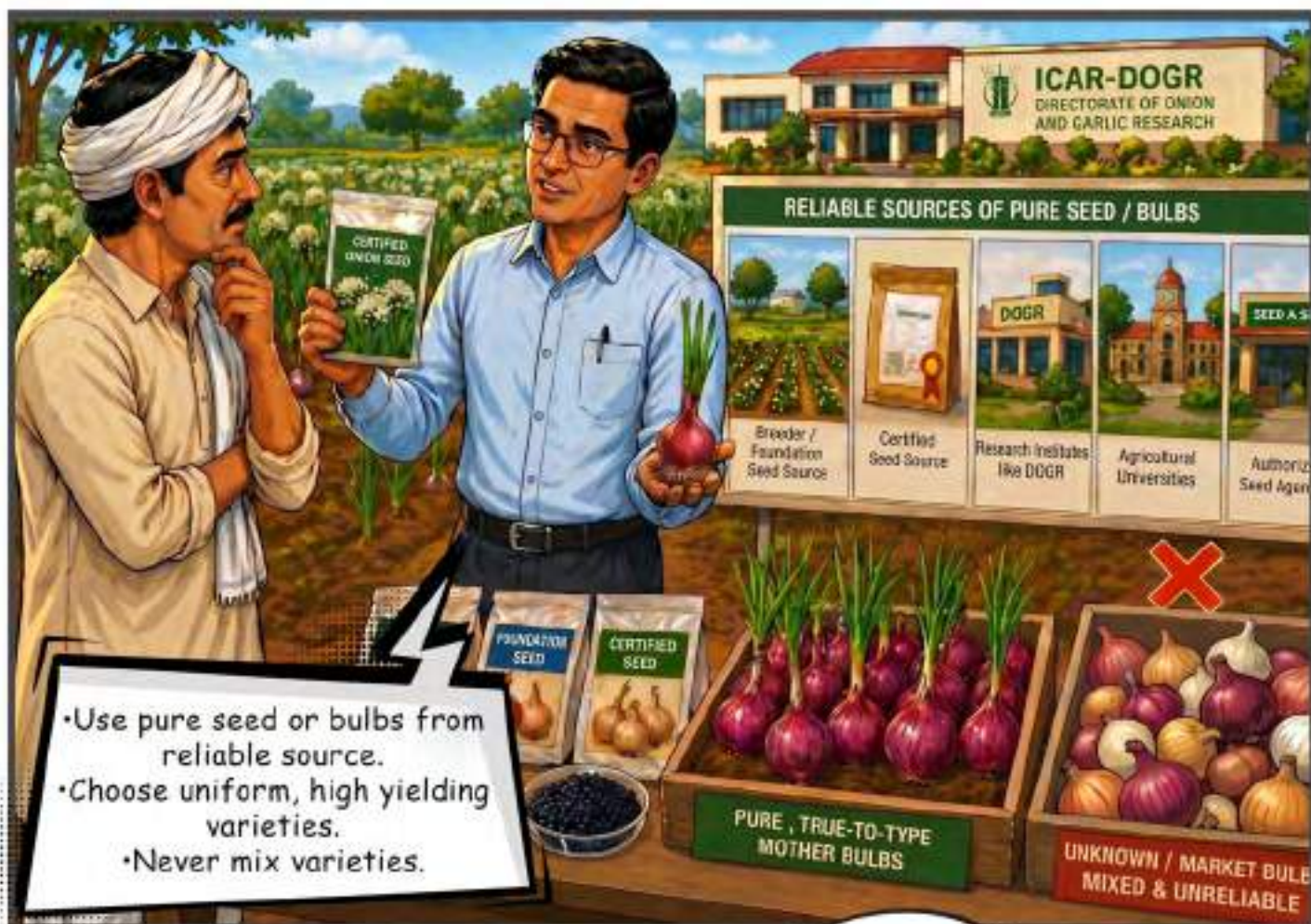
Onion Seed Production



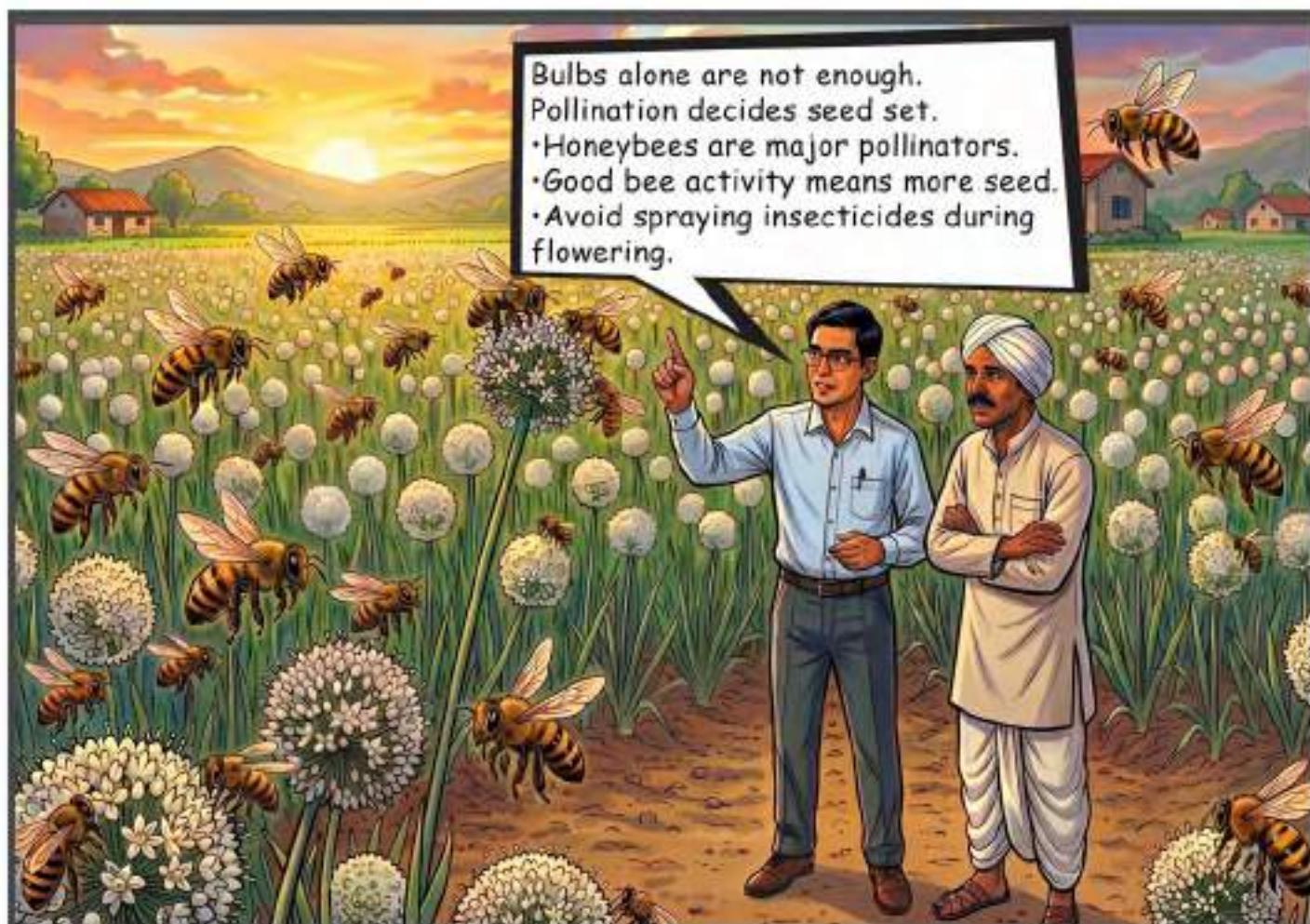


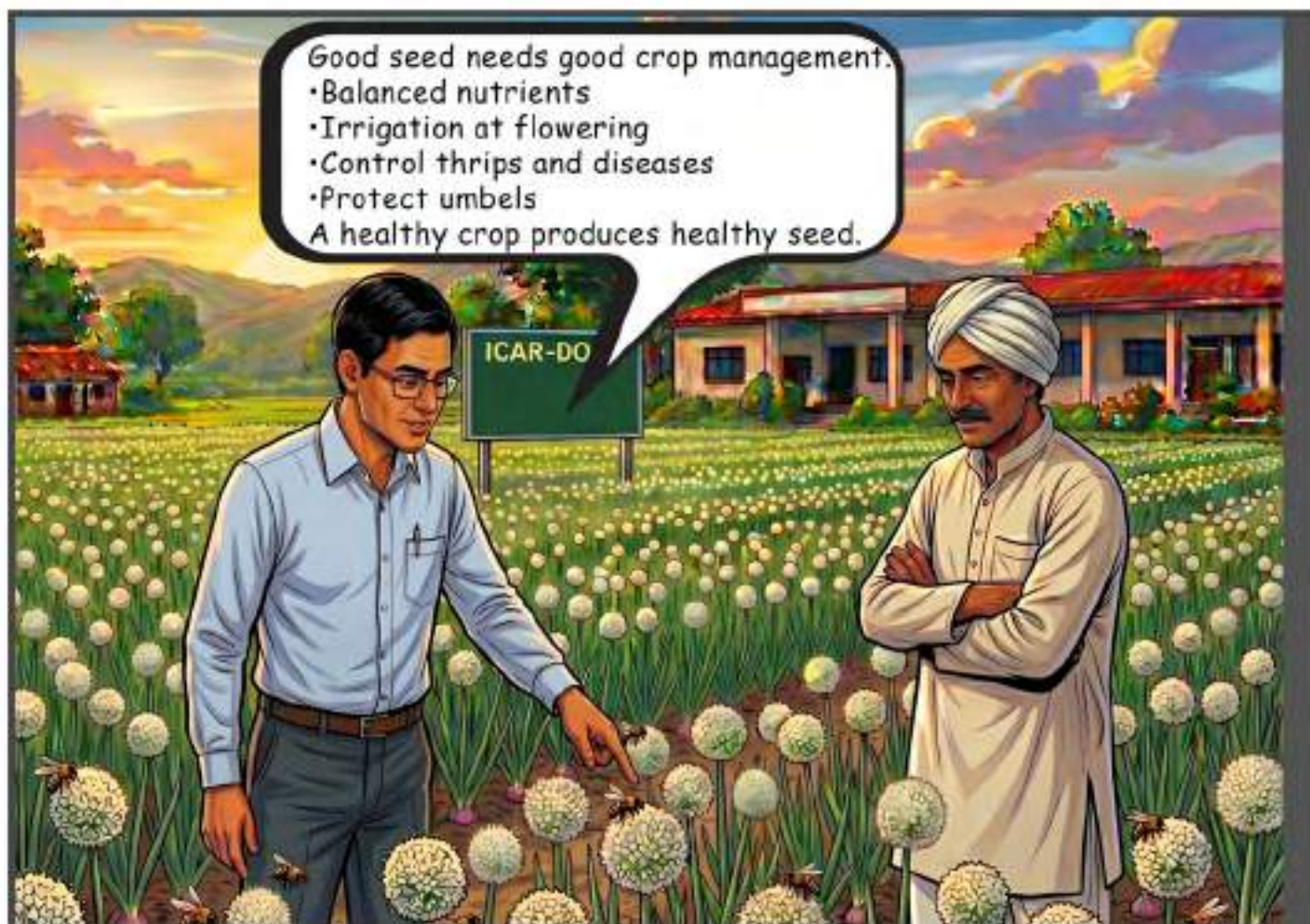




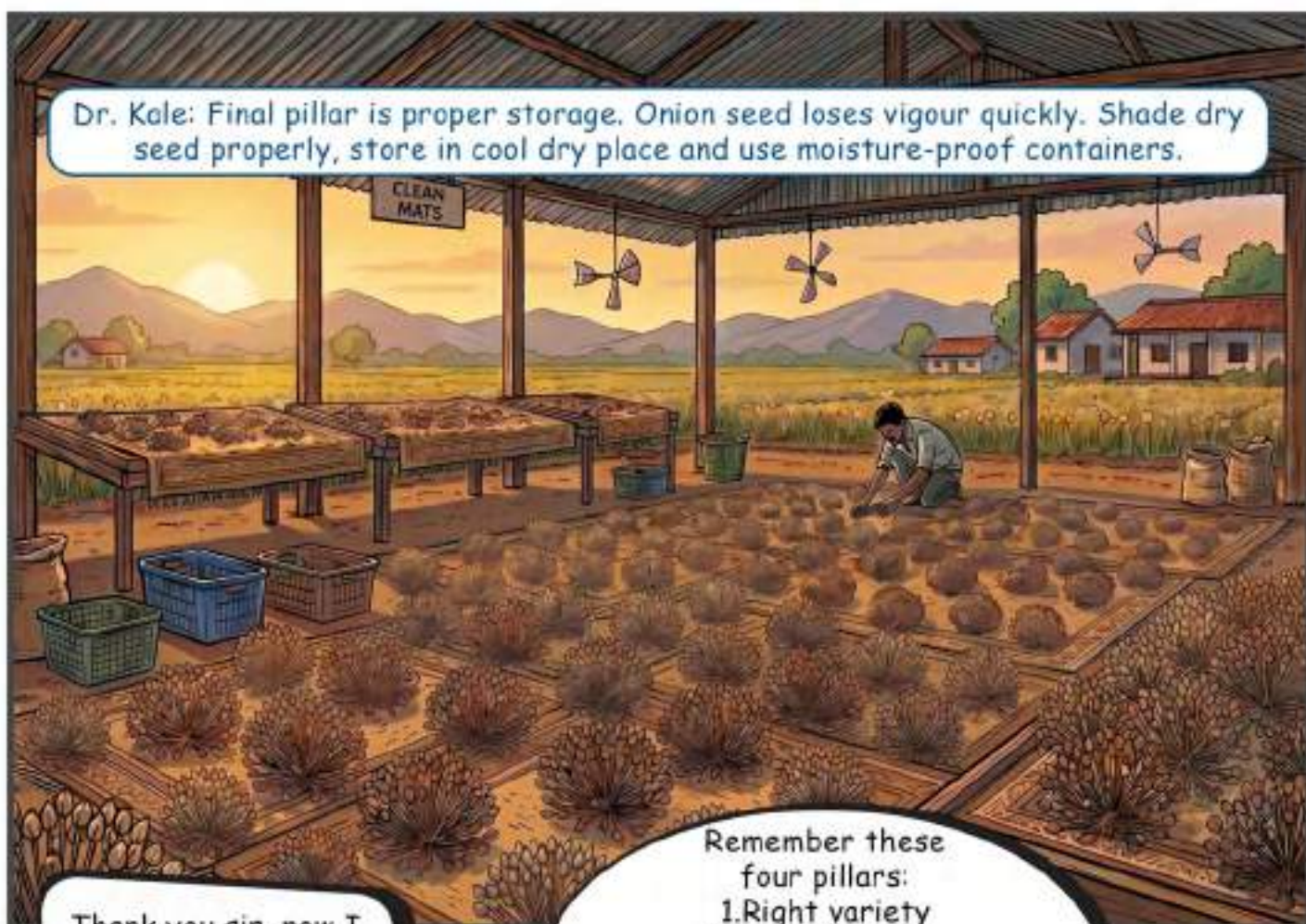








Dr. Kale: Final pillar is proper storage. Onion seed loses vigour quickly. Shade dry seed properly, store in cool dry place and use moisture-proof containers.



Thank you sir, now I understand—
Pure seed begins with
purity in every step!

Remember these
four pillars:
1.Right variety
2.Proper isolation
3.Good quality bulbs and pollination
4.Safe seed storage
Follow these... and quality
seed is assured

