INTERNATIONAL YEAR OF
PLANT HEALTH
2020

CSA

Managing Pests

Ramanjaneyulu
Centre for Sustainable Agriculture

Pests or Pesticides! Which are more damaging?

- Pests and Diseases are symptoms of underlying ecological distortions
  - Reducing biodiversity
  - Reducing Soil Health
  - High use of chemicals which kills natural enemies,
  - Resurgence and Resistance caused by selection pressure
  - Climate Change
- Alternate Frame work based on
  - Shift from molecules to kills to practices to manages
  - Preventive care than control
  - Ecological Engineering and Non Pesticidal Management

Insects

constitute about 75 % of the living beings

originated 30 crore years back where as human evolution started 10 lakh years back

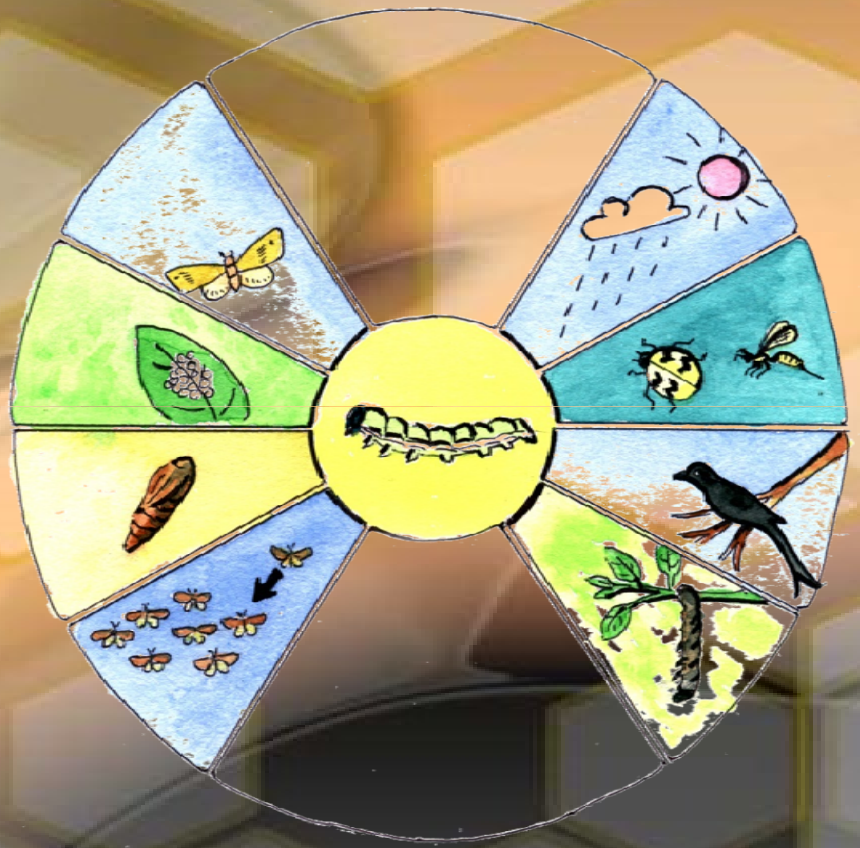
are persistence because of the

- Ability to withstand a wide variety of conditions
- Body construction
- High fecundity
- Flying nature

might have been covering the entire earth with several layers

but for

- the natural balance and
- the ingenuity of the farmers



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niphm.gov.in/IPMPackages.html

Bookmarks Sci-Hub: removing... Log In ‹ Centre for S... Agri Extension Add to KisanMitra Cotton Yield by Co... FRACTALS Smart Ur... Amity



राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान

कृषि, सहकारिता एवं किसान कल्याण विभाग, कृषि एवं किसान कल्याण मंत्रालय - भारत सरकार

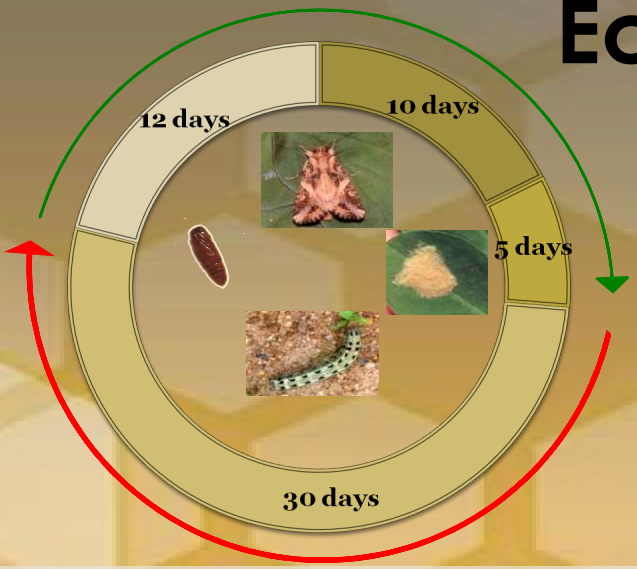
NATIONAL INSTITUTE OF PLANT HEALTH MANAGEMENT

Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India

AESA Based IPM Packages

Amla	Apple	Apricot	Arecanut	Banana	Ber
Betelvine	Black & Green Gram	Black Pepper	Brinjal	Broccoli	Cabbage & Cauliflower
Cashew	Castor	Cherry	Chickpea	Chillies & Capsicum	Citrus
Clove	Coconut	Coffee	Coriander	Cotton	Cucurbitaceous Vegetable
Cumin	Curry Leaf	Custard Apple	Drumstick	Fennel	Fenugreek
Fig	Garlic	Ginger	Grapes	Groundnut	Guava
Horse Gram	Jackfruit	Kiwi	Lablab Bean	Large Cardamom	Leguminous Vegetables
Lentil	Litchi	Loquat	Maize	Mango	Mint
Moth Bean	Oil Palm	Okra	Onion	Papaya	Passion Fruit
Pea	Peach	Pear	Pearl Millet	Persimmon	Phalsa
Pineapple	Pomegranate	Potato	Rajmah	Rapeseed Mustard	Raspberry

Ecological Approach to Pest Managem



tegrating management practices to prevent sects from reaching damaging stage / oportion

natural ecological balance will ensure that sts do not reach a critical number in the ld that endangers the yield

ture can restore such a balance if it is not eddled with too much, hence no chemical sticides at all.

nderstanding the insect biology and crop ology is important to take up right anagement practices-botanicals/microbials, rmmade/commercial









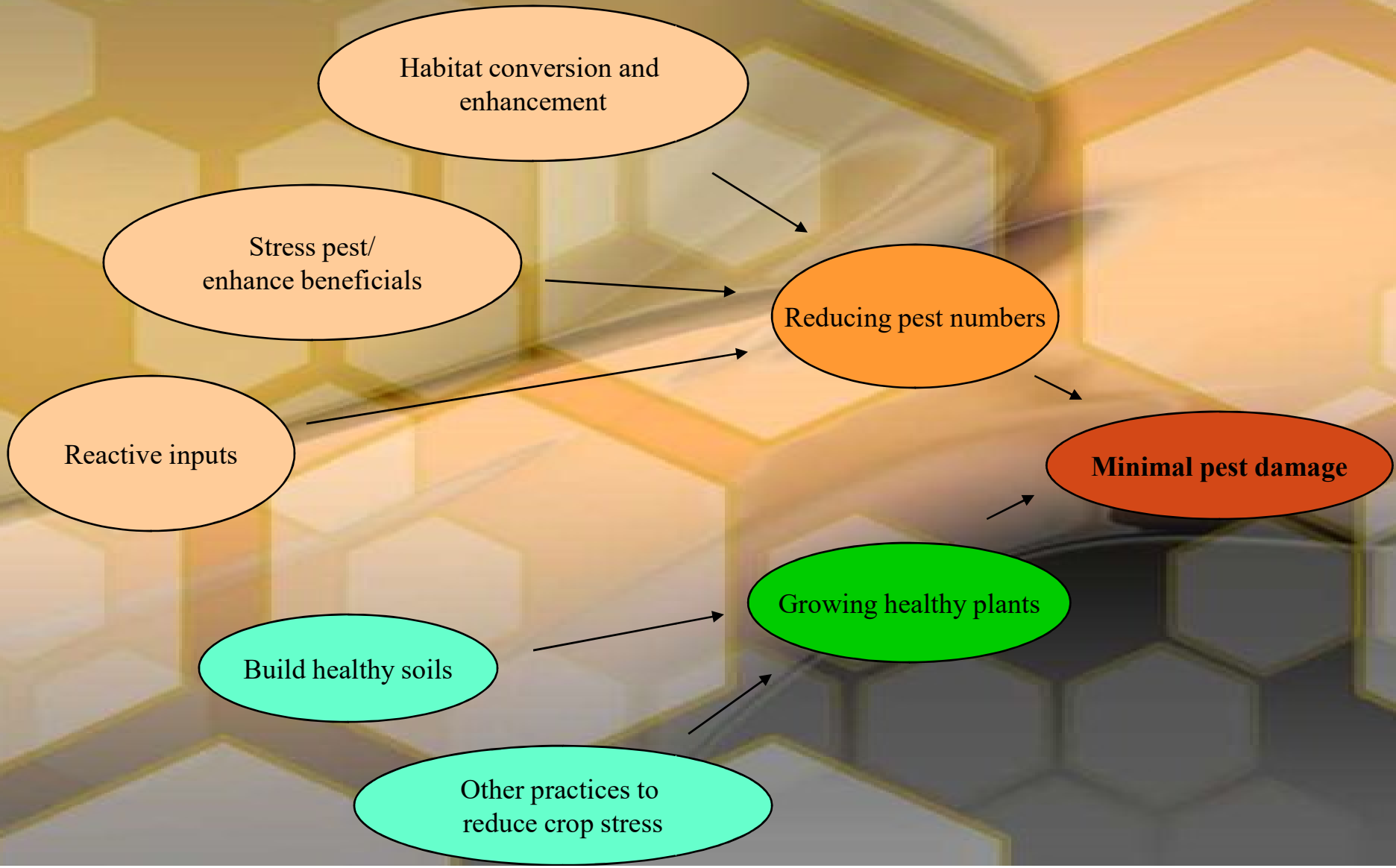








Non Pesticidal Management



American Bollworm

(September- March)



Adult

8 Days



Eggs

2-4 Days



Pupa

8-15 Days



Larva

12-20 Days

Damage

In various Crops















Tobacco Caterpillar

(April – October)



Adult
5-10 Days



Eggs
3-5 Days



Larva
20-30 Days



Pupa
7- 12 Days

Damage





Skeletonisation
in Castor





Severe Damage
in Groundnut













Brinjal Fruit and shoot borer

ample: Field diagnosis of spots on leaves



If the cause were an abiotic one you would expect to see a much more general yellowing or browning of the leaf without the sharp divide between healthy and unhealthy plant material



his cashew leaf has leaf spots, which are clearly defined and are ll a similar size.

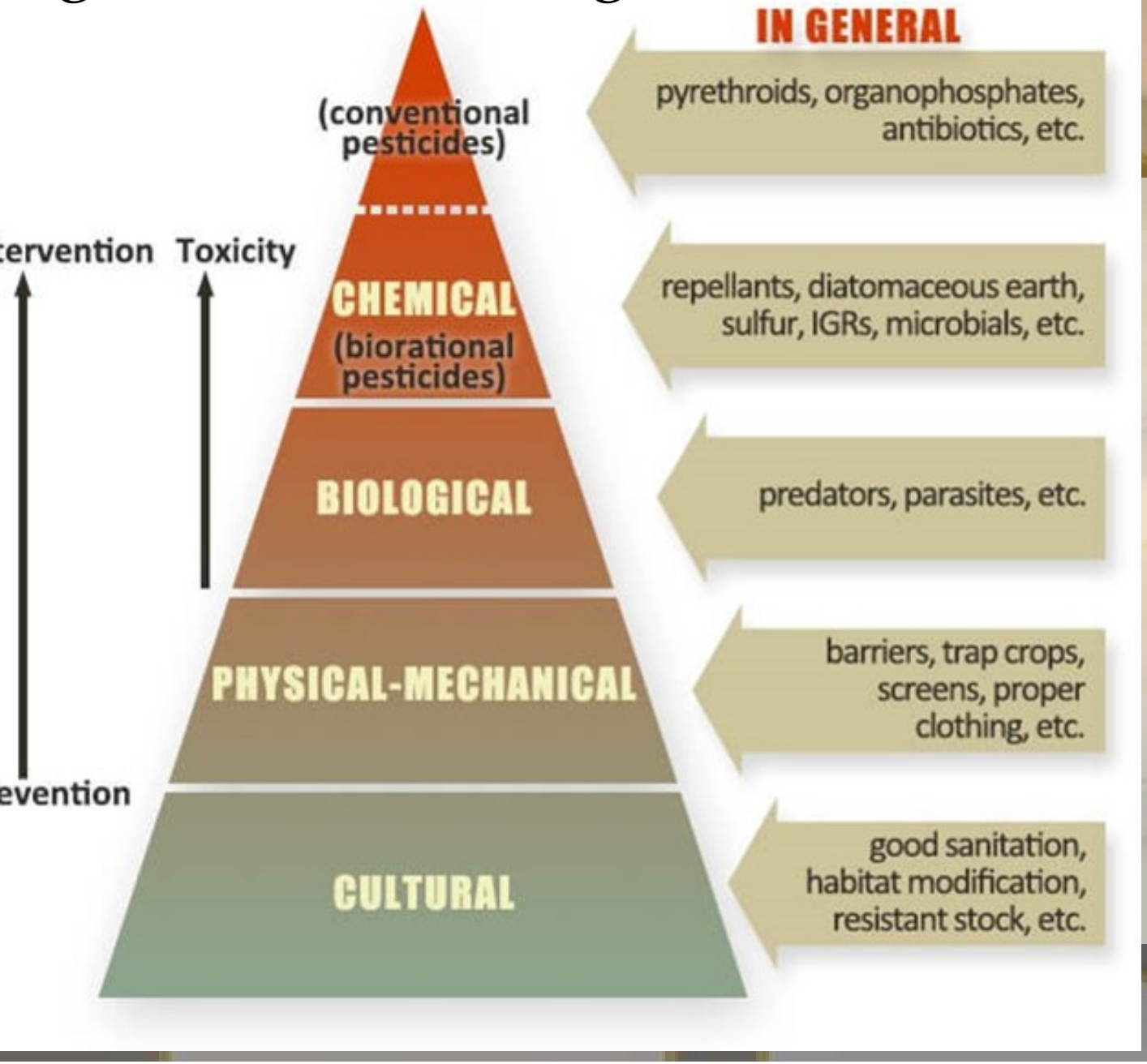
his clear delineation between healthy (green) and unhealthy (tan rown) tissue indicates that there is a biotic cause

atural Pest Management



- **educe stress**
- **uild healthy soils**
- **nhancing the habitat and anaging crop ecosystem**
  - Crop diversity
  - Trap and Border crops
  - Other agronomic practices
- **Understanding insect iology and behavior**
- **eactive sprays for control**

tegrated Pest Management





Tr







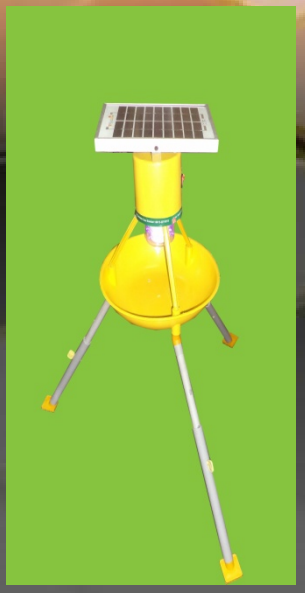













King
CATCHER






King
CATCHER


King
CATCHER

Green sprays

Local resources like neem, cowdung, chillies etc can be used to make foliar applications

Solutions/Extracts

- Aqueous or other suitable solvent
- Chilli-garlic extract
- Neem extracts

Decoctions

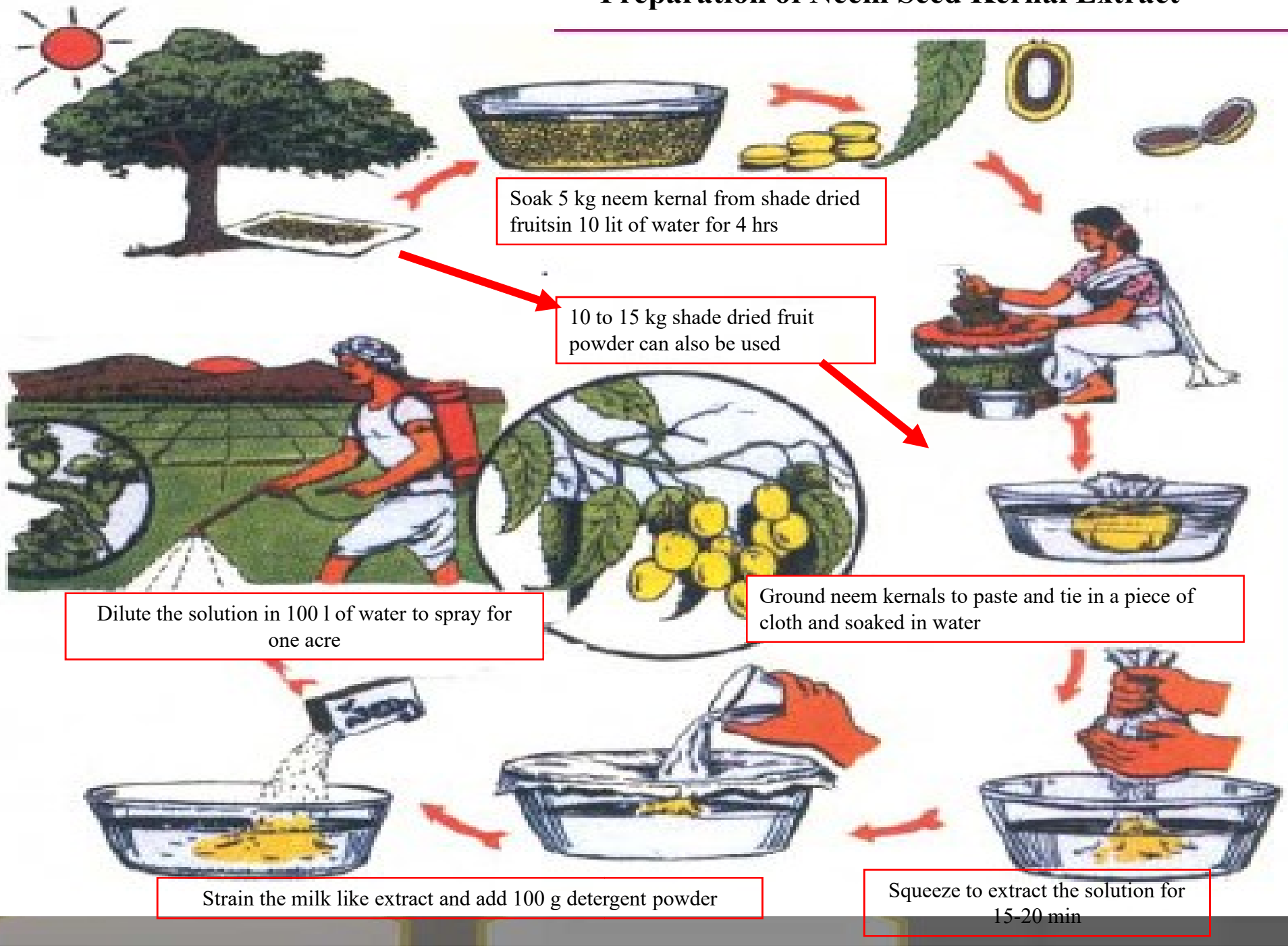
- Boiled in water and filtered
- Nux vomica dec
- Tobacco dec

Fermented solutions

- Fermented products
- Microbial solutions
- Panchagavya, Amruthajalam,
- Jeevamruth



Preparation of Neem Seed Kernal Extract







Boil 5 kg leaves in 10 lit of water for ½ hr



Stir the solution



Cool the solution and strain the extract



Add 100 g of detergent powder



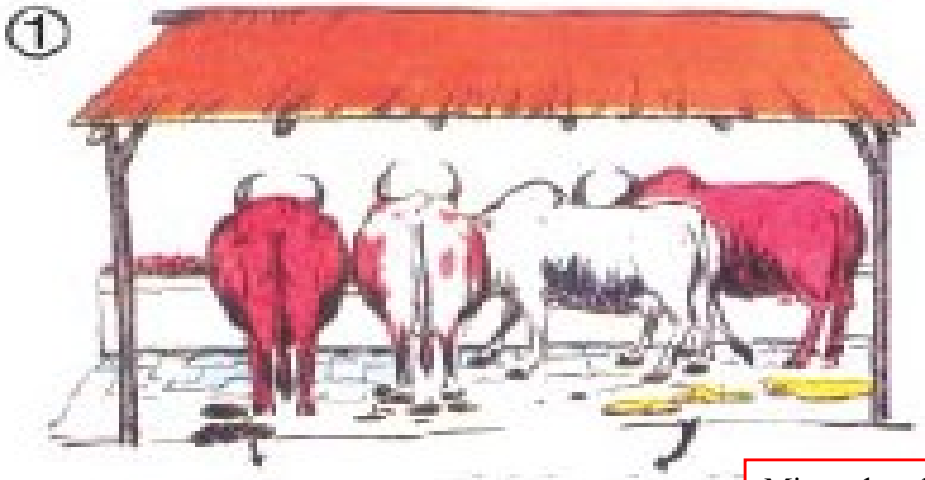


Dilute the extract in 100 l of water to spray for an acre



Nux vomica leaf extract

Cattle urine solution





Mix and soak 5 kg cattle dung, cattle urine in 5 l of water



Cover the tank and ferment for 4 days



Stir the solution every day



Strain the extract after 4 days and add 150 g lime

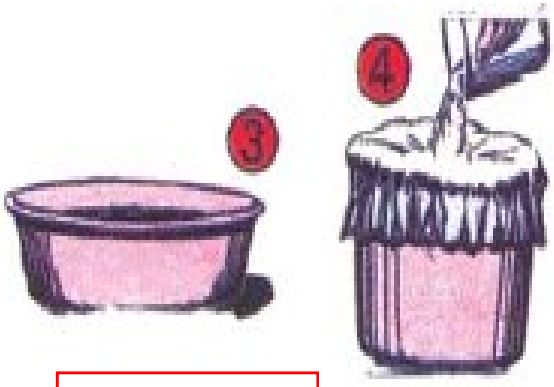
Dilute the solution in 100 l of water to spray for one scre







Take 3 kg chillies, remove the stalks, grind to paste and soak in 10 l of water overnight



Strain the extract



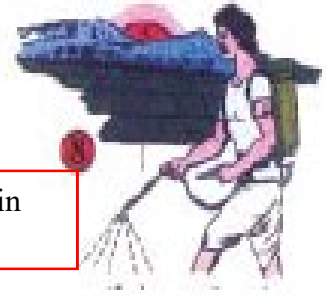
Mix chilli extract, garlic extract and 75 g detergent powder solution



Grind ½ kg garlic and soak in 250 ml of kerosene overnight



Strain the extract



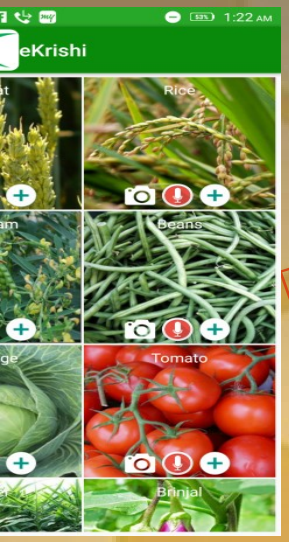
Strain the solution after 4 hrs and Dilute in 100 l of water to spray for an acre

Chilli Garlic Extract

Microbial solutions

- **Source of micro organisms**
  - **Cattle Dung:** Cellulose, lignin solubulising bacteria, nitrogen fixing, phosphorus solubulising bacteria, endobacteria, entomopathogenic bacteria
  - **Buttermilk:** lacto bacillus
  - **Toddy:**
  - **Soil:** Pseudomonas, rhizobium, azatobactor etc
- Source of nutrients
  - **Sugars:** Jaggery, sugar cane juice, honey, fruits etc
  - **Fats:** ghee, oil, oil cake
  - **Proteins:** pulse flours

Pestoscope



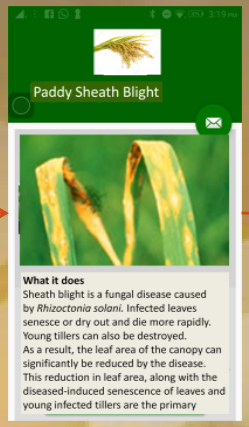
p menu

ner can choose the
to find the disease or
l a query through
o/audio/video





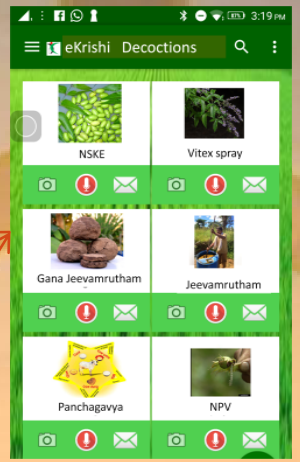
Problem identifier



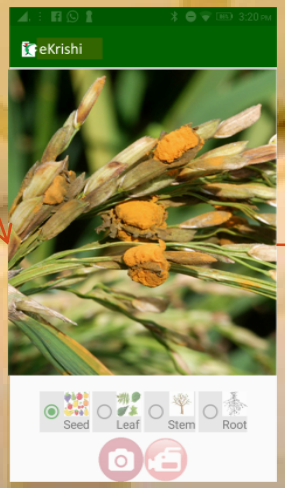
Problem solution



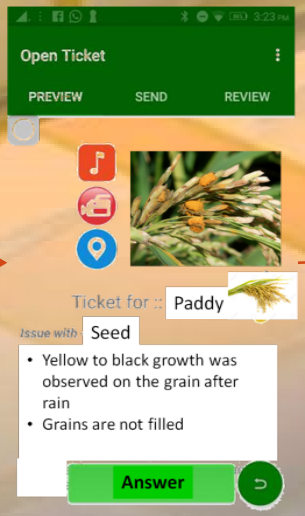
Solution Details



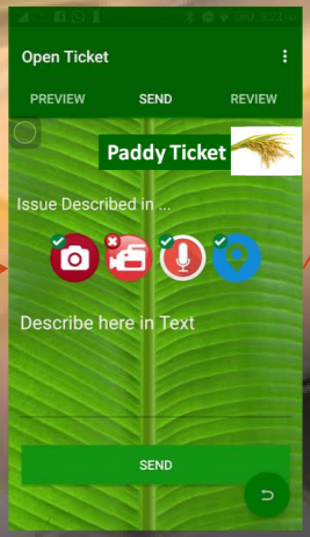
Options



Query
Photo/Video of plant part and question in text or audio

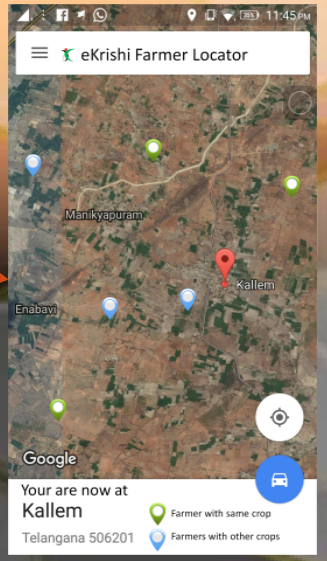


Query
Expert view



Expert Response

locate users with same crop/adopting similar practices



Farmer Locator

Farm Advisory Service





Audio and Text Messages in Local Language

Conventional Produce

Organic Produce

Market Information

Weather Data
Advisory from



Vepada (APSDS)

SKRS puram (CSA)

Local AWS

KisanMitra
always with you

Kisan **Mitra**
Farm Advisory Service



Local Market

AgMarknet
Connecting Farmer to Market

Local Market

Pest and Disease Surveillance

Application

Insects Field Monitoring

Agri Univ & Dept of Agril

Diseases Field Monitoring

Helpli

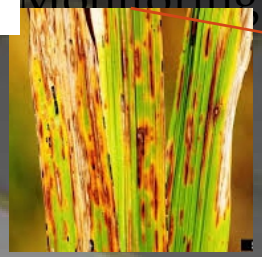








ANGRAU

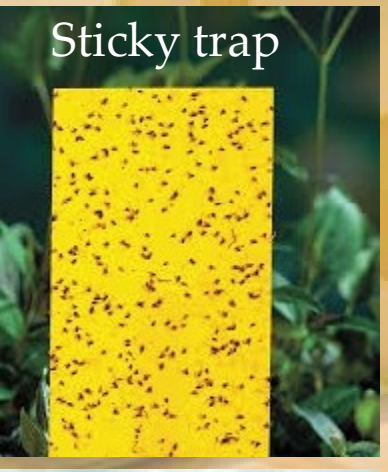






Biotic Stresses Surveillance







- Regular monitoring at the village level to understand the kind of pest and disease build up species wise, number wise and abiotic stresses like droug advise farmers for necessary action.
- Pest data is correlated with weather data for long term prediction

Insect Pests

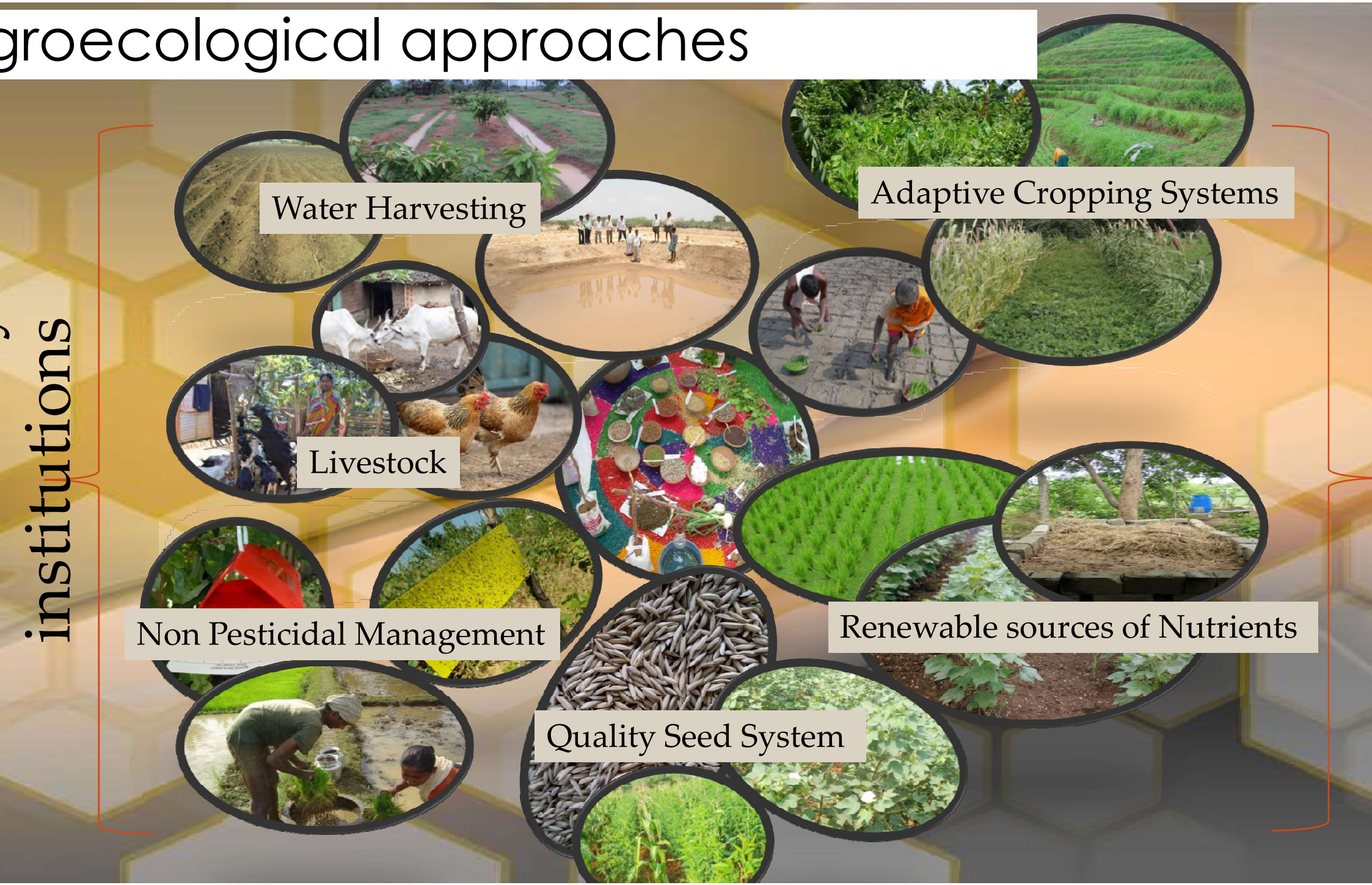
- Insect pests are attracted to light, color and smell of pheromones. Using th characters a pest surveillance system with Light traps, sticky traps and pheromone traps can be built at the village level.
- We follow fixed plot survey methods where different traps (based on the cropping pattern in the region) and the data is compiled to make assessme the pest/disease situation and advisories are issued at the village level.
- The traps are based on the insect types. For examples more sucking pests a attracted to light and sticky traps, while borers are attacted to pheromone traps.

Plant Diseases

- Plant disease assessment is based on the survey done in identified fields assess the disease severity.
- Incidence and severity: low (<20%), moderate (20-40%), high (40%<)
- Percentage of infection is calculated based on the following formula

$$\text{Disease. \%} = \frac{\textit{Number of Infected Plants}}{100\,(\textit{Selected Plants in 1m2})}\,x100$$

groecological approaches



Farmer Field Schools











Tools you can use

- Download Non Pesticide Manuals
- NPM Packages: http://www.pestoscope.com
- IPM Packages: https://niphm.gov.in/IPMPackages.html
- Pest diagnostics and identification: http://14.139.92.166/Incubation/Webform1.aspx
- PestSmart Field Diagnostic Guide
- Android Apps:
  - Plantix
  - Pestoscope

Why Alternatives are not spreading on their own?

- Knowledge intensive approach needs a shift in extension approach
- Shift from ideological rhetoric to science based approach
- Grassroot extension worker needs to have
  - a practiced experience
  - adaptive knowledge
  - a problem solving approach
  - backend support, and
  - Foremost a confidence in the approach
- Changing the narrative

To summarise

- Alternatives exist-we need will on the government to shift priorities in research and extension. This needs investments, changes in assessments and building accountability systems
- District and State level targets to increase preventive care and reduce per ha pesticide use is essential irrespective of Conventional/IPM/ NPM/ Organic or Natural farming models
- Ecological performance of agriculture along with economic performance at State and National level should be monitored and shared in public domain


Regular Trainings organised on
Organic/Natural Farming Practices
Natural Resource Management
Goat Production and Backyard Poultry
Rural Livel ihoods and Enterprises
Food Processing
Farmer Producer Organisations
Public Policy issues in Farming
GRAMEEN ACADEMY
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