GAP: Good Agriculture Practices including IPM

What to put/look for in your agriculture RPFs, Proposals & AWPs

Module Objective:

Trainees Know & Explain GAP and IPM basics

Module Overview

- There are different GAP/IPM definitions
- How GAP/IPM fit info the project life cycle
- Examples of field GAPs/IPM practices
- GAPs/IPM include post-harvest processing issues; overlap with HACCP
- GAPs include pesticide storage/use/safety
- Numerous field IPM methods: monitoring tools resistant plants, field barriers, parasite nectaries, traps, soaps, oils, diatomaceous earth, sulfur, copper, predators, mating disruption…

What are GAPs?

- Best Management Practices for every crop or animal production and post-production (harvest, storage, processing) system
- Result in safe & nutritious food/security
- Promote economic, social & environmental protection
- Promote natural resources (water & soil) sustainability
- Many are market-driven & consumer-demanded

Why is this important to you?

- **RFP**: Write requirements for GAP/IPM for each crop/animal production system
- **Proposals**: See evidence of successful use and understanding of GAP/IPM
- **Environmental Assessments**: Request GAP/IPM included in recommendations
- **Monitoring**: Recognize and be able to Critique GAP/IPM in the field

Examples of Field GAPs

- Monitor irrigation water quality for absence of E. coli
- Sufficiently compost animal manure to kill E. coli
- Exclude domestic animals from fields during production

Examples of Field GAPs

- Take & analyze soil samples to determine soil structure & micro-nutrients requirement
- Manage irrigation by measuring soil water tension
- Use black plastic solar soil sterilization

More GAPs

- Use of earthworms for soil texture & health
- Terracing to stop soil loss by erosion
- Use of raised bed + drip irrigation for water & disease management

Process Facility GAPs

- Have appropriate sanitary facilities away from processing & have wash stations
- Employees wear proper clothing
- Do you notice any overlap with HACCP?

Processing GAPs

- Do not release livestock or dairy processing water to environment

- Compost vegetable processing waste & coffee pulp: DO NOT dump into waterways

GAPs include on-farm pesticides safety practices

- Use a locked storage shed with shelves
- Use mostly ‘green label’ pesticides
- Keep the place neat, clean & organized

Farm pesticide GAPs

- Use full PPE "personal protection equipment"
- Use signs to warn people of pesticide hazard

Farm pesticide GAPs

- Use a dedicated pesticide mixing barrel & in-ground carbon trap

- Use barrels for collecting & holding used containers

What is IPM?

There are many definitions of IPM

It is the use of any pest control tactic smartly integrated with any other pest control tactics. We can:

- Use plant varieties that are resistant to the pests
- Keep plants strong by maintaining proper nutrition, watering, and soil health

With IPM we can:

- Monitor pests to see when they are present and make sure control is cost-effective
- Trick and Avoid pests by planting or harvesting early or late
- Trick pests by using pheromones (attractant smells) to disrupt their mating or trap them

What else can we do?

- Trap pests by planting attractive plants on the edge of the crop field—then destroy them
- Use special plants to attract parasites & predators to the crop field—so they kill pests
- Induce an 'immune response' in crop plants—so they repel or kill pests
- Apply special plant extracts, microbes and parasites—so they repel or kill pests

Also, we can:

With resources,

- Use computer models to predict pest's activities
- Use the latest plant, soil and water analysis techniques
- Buy the latest microbial, hormonal & pheromone chemicals
- Buy parasites and predators to release

Does IPM vary from developing to highly developed countries?

- Small farms versus Large farms
- Low value subsistence crops versus High value cash crops (rain-fed vs irrigated)
- Access to and affordability of the latest information and off-the-shelf technologies
- Access to education, money for buying latest technologies

Where does GAP end, and IPM begin?

- Raised bed with drip irrigation
- Constant monitoring for diseases & pests
- Plant & soil analyses
- Plastic or organic mulches exclude weeds
- Cover material & greenhouse exclude insect pests

Indigenous IPM tactics on Small Farms

- Inter-plant many crops & pest repellent plants together—reduces pests
- Hand pest control (weeding, picking pests)
- Use manures, compost & mulches

More Indigenous IPM tactics on Small Farms

- Leave border plants—these serve as barrier to pest movement
- Plant flowers near crop—these attract parasites
- Remove dead or diseased plants or branches—stop the disease spread

Yellow sticky trap to detect & monitor incoming pest presence & populations

Use of pheromone traps

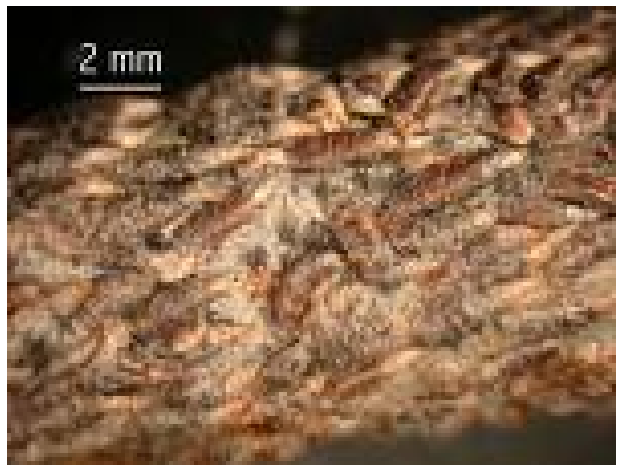
- To monitor presence of pest—are they here yet?
- To monitor population levels—are there a lot of them?
- To trap pests—and kill them with sticky material or pesticide

Use of Resistant Plants

- The seed comes with the resistance built in: Easy technology to transfer
- Resistance can be from bad taste, toxicity, hairiness, spines, stickiness
- What are drawbacks of this technology?

Use of Oils (petroleum, fish & plant oils)

- Insect, mite & disease control
- Block air flow into insects, mites & eggs
- Irritate & repel insects
- Stop aphid virus transmission
- Suppress some fungal diseases



Use of Soaps (potassium & ammonium salts of fatty acids)

- Smother slow, soft-body pests (aphid, whitefly, mealybug, mite)
- Disrupt cuticle formation
- Some suppress powdery mildew disease formation

Use of Kaolin & Diatomaceous Earth

- Acts as a physical barrier to feeding
- Repels feeding & egg-laying
- Masks/covers insect-attractive plant color
- Irritates insects, cuts cuticle
- Some formulations suppress diseases

Use of plant extracts

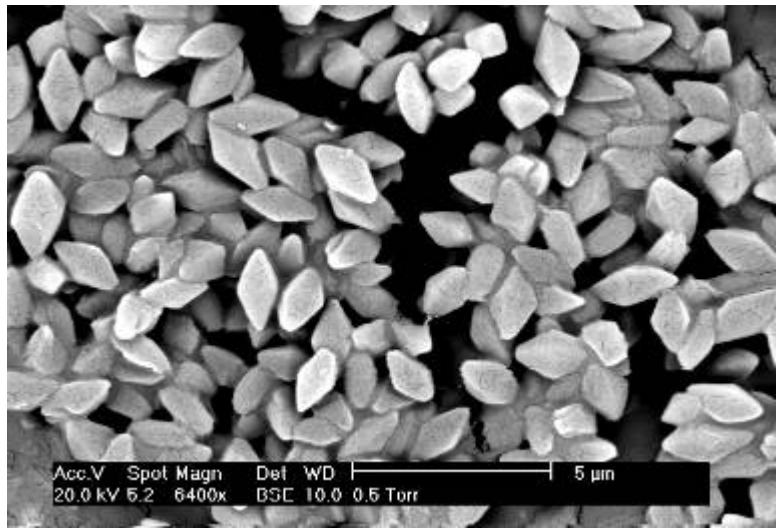
- Rotenone
- Neem
- Pyrethrum
- How do these act to control pests?

Use of copper products

- Copper oxide, copper hydroxide, copper oxychloride, copper sulfate
- Kill bacterial & fungal diseases
- Denature & disrupt protein functions inside bacteria/fungus

Use of bacterial products

- Bacillus thuringiensis
- Bacillus subtilis
- Beauveria bassiana
- Coniothyrium minitans
- Abamectin
- Spinosad



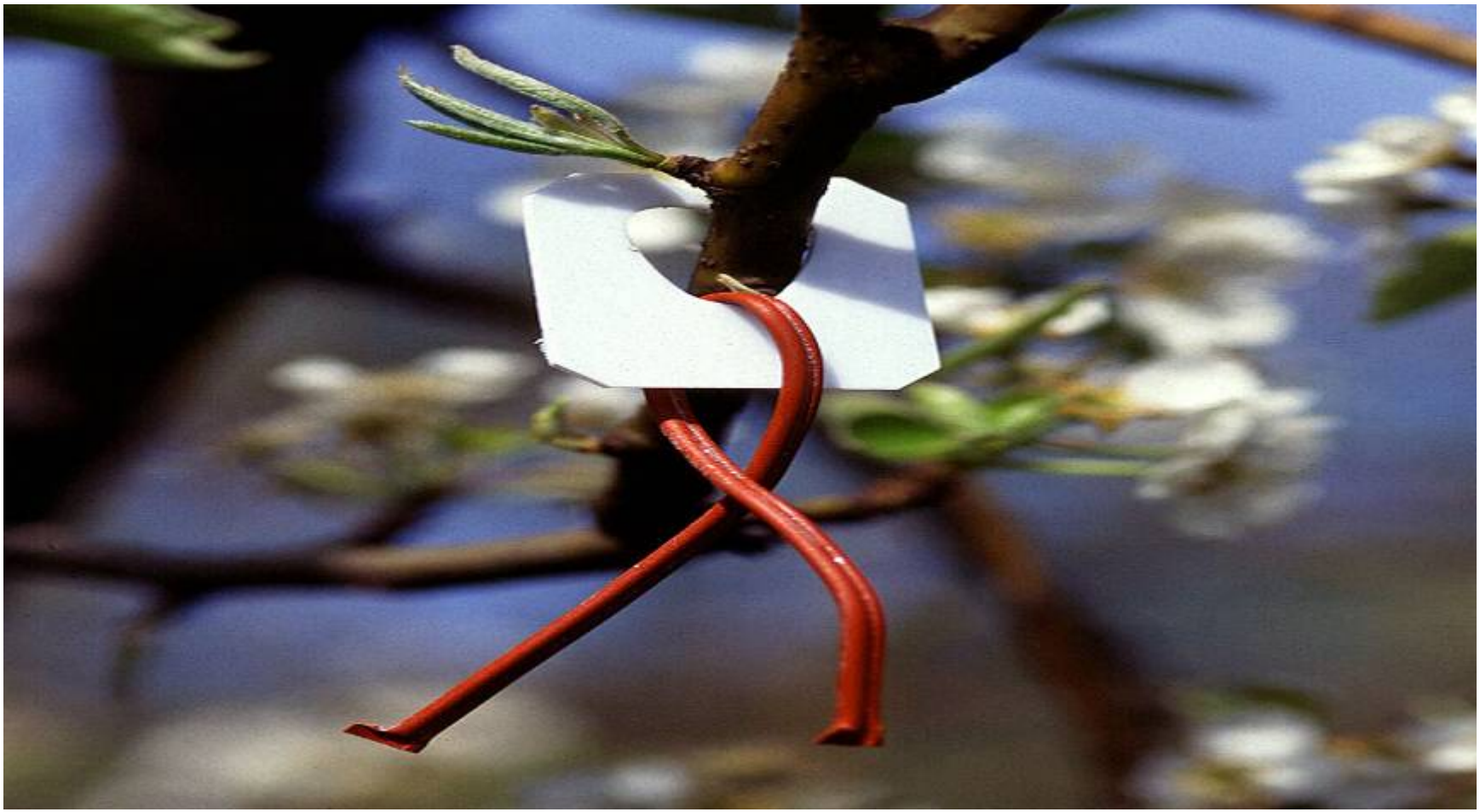
Use Purchased Pollinators, Parasites & Predators

- Dutch Koppert produces and sells Pollinators, Parasites & Predators

- Blegian BioBest also produces and sells Pollinators, Parasites & Predators

Koppert's Maintenance Free Hive

Coddling Moth Mating Disruption Pheromone Dispenser in Apple Orchard



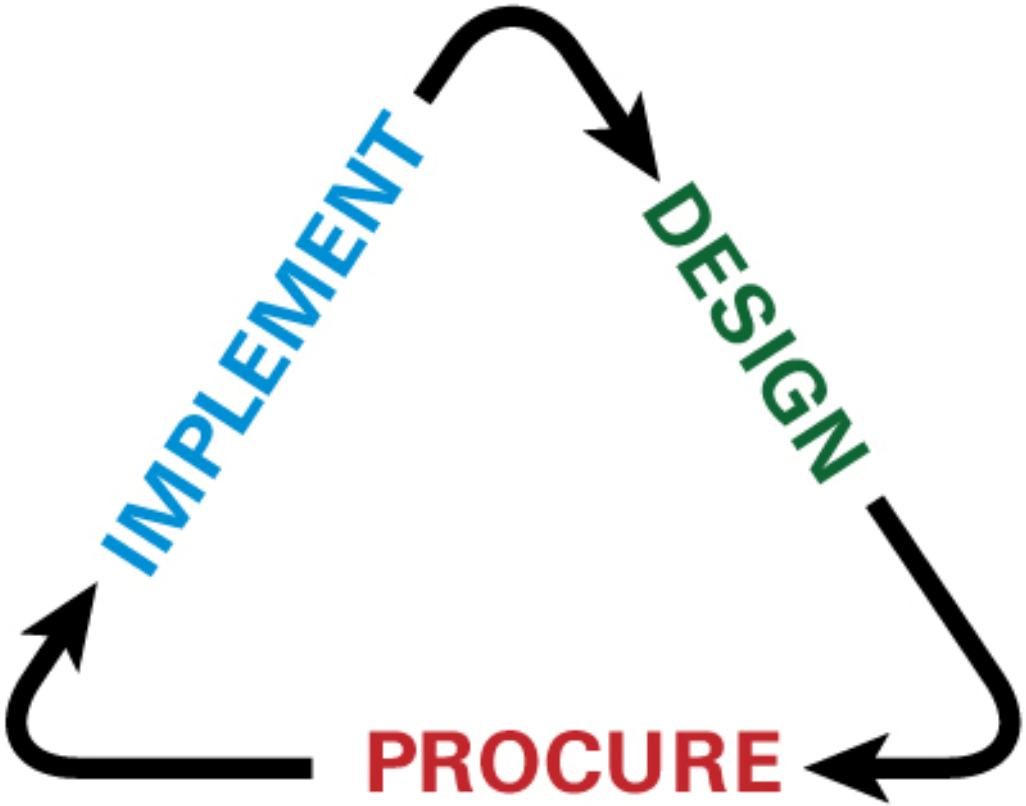
Wrap Up: What you need to know

- Overlap between GAP & IPM
- Good water, soil, plant/animal, pesticide and hygiene management & conservation
- Use of constant monitoring, terracing, raised-bed, plastic mulch, drip irrigation, resistant plants, field barriers & flowers that attract parasites & predators
- Use of traps, mating disruption, soaps, oils, kaolin, sulfur, copper, predators/parasites
- Many useful for International Markets Certification, some useful for Organic

And, you should remember that

- There are differences between high & low value crops, small & large hectarage, rain-fed versus irrigated
- There are big differences between countries with and without resources for computer systems and precision models for predicting pest outbreaks

How do GAP and IPM techniques fit each part of the project life cycle?



Exercise

- Each table break into 2 groups
- One group is the GAP/IPM implementer
- Other group is the USAID CTO/MEO
- Each group discusses and makes a plan for their:

Proposal to AID: include GAP/IPM (implementers)

RFP to Implementers: GAP/IPM Expectations (USAID)

- What will each group put/look for in AWPs, Quarterly Reports, and Field Monitoring