



Student Handout 5: Case Study – Pests and Diseases

Name: _____

Date: _____

Instructions:

Split the class into two groups and assign each group a case study to research.

Case Study 1:

Farmers: Bob & Sally Jenson

Location: Minnesota, USA

Crop: Soybeans

Problem: Bean Leaf Beetle¹

Agronomist Report: An agronomist inspected this crop and noticed that all stages of plant growth were impacted. There is a decrease in crop yield and poor seed quality. The beetles are feeding on pods and breaking the pods, as well as scarring the leaves allowing for fungal pathogens to enter. Last, the agronomist report said this beetle was carrying a virus to the plant called bean pod mottle virus, which is mainly a concern if the Jenson's are selling their soybeans for food because it affects the seed coat quality.



1. Research the Bean Leaf Beetle

2. Identify at least one solution to address this pest

Case Study 2:

Farmers: Shad & Lita Meena

Location: Kenya, Africa

Crop: Maize

Problem: Maize Lethal Necrosis Disease (MLND)²

Agronomist Report: An agronomist inspected this crop and noticed a 30 percent loss in yields! The agronomist could see the leaves were dry, there were malformed ears, sometimes even no ears on the plants and some of the ears were rotting. The agronomist let the Meena family know the disease was likely from a long drought, poor soil fertility and poor agricultural practices.



1. Research the Maize Lethal Necrosis Disease

2. Identify at least one solution to address this disease

Answer Key

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Case Study 1: Bean Leaf Beetle

Possible solutions: Cold winters can be an asset in reducing the beetle population. Farmers can also plant soybeans at a later time in the year, if weather and the growing season allows (soybeans take at least 60 days to grow). An option in a home garden is to physically pick the beetles off the plants; this is not possible on farms due to the large area. Some farmers may choose to use an insecticide if the population is severe and the environmental conditions meet regulations. The use of chemicals on a farm is highly regulated, and farmers have special training to apply these products to ensure they are used safely.³

Case Study 2: Maize Lethal Necrosis Disease (MLND)

Possible solutions: A government or agricultural industry task force can help provide surveillance and workshops to educate farmers so they can identify the problem early on. Knowledge is power! Farmers should remove affected plants; use crop rotation (grow a different crop next year); be aware of specific season and planting time to avoid spreading the disease; apply good agronomic practices like the 4R Nutrient Stewardship System so the plants are receiving proper nutrients to fight the disease early on; and use chemical sprays under specific circumstances. Additionally, the agricultural industry can work on breeding seeds that are resistant to the disease and creating new markets to use the affected remains of plant materials.⁴

Lesson Plan

Project the *Plant Health* PowerPoint

Slide 22-23: These are optional slides to accompany the case study. They describe some of the realities in agriculture, such as:

- Farmers never stop learning how to protect their crops.
- Practices and technology are constantly evolving.
- The goal of every farmer is to grow a healthy crop while balancing a budget and environmental footprint.
- Farmers must use the resources they have locally to make informed decisions to protect the health of their plants.
 - Does a Kenyan Farmer have the same equipment as a North American Farmer? (No. There are hundreds of variables that would impact what equipment is used in either country: amount of land, type of crop, budget, mechanics and parts, training and education, etc.). A Kenyan farmer might apply fertilizer nutrients using a measuring spoon and walking their one-acre lot, while a North American farmer might use a tractor with global position systems and air seeder to fertilize hundreds of acres. The agronomic practice is the key similarity – if both use 4R Nutrient Stewardship System, they will increase their chances of a healthy crop, balanced budget and environmental protection.
 - How does an organic farmer respond to a problem with nutrients, pests or diseases as compared

to a conventional farmer? There is no one-size-fits-all solution. In the end, every farmer grows the healthiest plants and animals they can. Organic vs conventional practices is a hot topic in North America. Both practices play a role in feeding the world responsibly. If you'd like to learn more about each practice please visit: www.Journey2050.com.

- Remember, a farmer's livelihood depends on sustainable practices.

Sources

¹ <https://www.pioneer.com/home/site/us/agronomy/crop-management/soybean-insect-disease/bean-leaf-beetle/>

² <http://agricnation.com/disease-still-ravaging-maize-east-africa/>

³ <http://www.extension.umn.edu/garden/insects/find/bean-leaf-beetles/> and <http://www.farms.com/field-guide/pests/bean-leaf-beetle.aspx>

⁴ <http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/179179/> and http://www.fao.org/fileadmin/user_upload/emergencies/docs/MLND%20Snapshot_FINAL.pdf