National FFA Team Problem 2015

Instructions:

Read through the scenario set up below and using the information provided develop a written production plan based on common accepted management practices but taking into account the growers preferences as stated in the scenario. In addition, you should prepare a budget highlighting expenses and expected income for the field described. Be prepared to present an oral summary of your production plan and budget.

Introduction and Scenario:

Your agricultural consulting expert team has managed to interest a large Virginia corn producer in your company. The producer, however, would like you to demonstrate your expertise before he employs your company for all his acreage. He has agreed to use your team's corn production program in an irrigated field that he has available. The field has linear irrigation that can easily supply the typical 12 acre-inches of irrigation water needed to mature a corn crop in his area. The field he has chosen is a rectangular field that is 5,500 feet long by 1,440 feet wide (**round this to the nearest whole acre** when you calculate the number of acres in the field) which allowed him to employ a linear system rather than the usual center pivot irrigation system. In this way, he's able to irrigate the entire field area.

Field History: The field the grower has chosen to use to test your recommendations is in a 1:1 rotation, one year in corn, 1 year in full-season soybean with a spring oat-tillage radish cover crop mixture planted after each corn corp. The soybean cultivar usually chosen is a maturity group V bean (long-season for his area) and the crop harvest date is too late in most years for him to plant a winter cover crop. The grower plans to use normal management practices for his area and for high, yield irrigated corn.

This field has less than 2% slope and does not suffer from erosion especially since a no-till cropping system is employed. Therefore this field is classed as a not highly erodible soil. The soil type is a loam soil that is well to moderately-well drained. The soil is classed as a medium-texture soil.

The grower reports that at his normal planting date, he does have a few grass weeds popping through but they are always less than 2 inches in height. The grower typically applies a burndown and preemergence herbicide application just prior to planting his corn crop.

Tillage: The tillage employed by this producer is **continuous no-till**. This system results in substantial crop residue (especially corn fodder) on the soil surface. Because of the amount of corn residue on the field and in nearby fields, the grower is concerned about gray leaf spot as noted below in the disease section.

Weed Profile: The grower has a history of the following weed species in the chosen field. The most problem grass weed that usually appears is large crabgrass. For broadleaf weeds, the grower reports that he has jimsonweed, morningglory (ivy), giant ragweed, and glyphosate-resistant Palmer amaranth (a difficult too control pigweed since it often emerges over a long period of time necessitating a post-emergence herbicide application with additional triazine).

Disease Incidence: The grower is concerned about gray leaf spot since he is located near a large river and the humidity in the area is often high. He has had significant problems with gray leaf spot in the past few corn rotations since he has substantial corn residue in his fields and his neighbor plants corn hybrids with little to no resistance to the disease. The field also runs in the direction of west to east accounting for a problem he has had with greensnap in years when storms with strong straight line winds come through the area during the V8-V14 rapid growth phase. Note: Greensnap occurs when strong straight-line winds hit a corn field during the rapid growth phase when plenty of nitrogen, water, and sunlight are available to cause very rapid growth resulting in relatively weak stalks. Usually corn plants are snapped in half around the 8th to 10th node and although the upper portion of the plant often remains attached to the lower stalk, the plant can't recover and fails to produce an ear or any grain.

Note: The grower has stated that it is his intention to apply a fungicide and insecticide combination at VT (tasseling) or R1 (silking) to help control foliar diseases (especially gray leaf spot—highly likely due to the crop residue present and the high humidity irrigation creates) and Japanese beetle silk clipping. The grower insists on using **the highest rate allowed** for the fungicide treatment. The grower also plans to follow this first application with a second insecticide foliar spray at early milk stage (R3) to help control the stink bug problem he has experienced in the past.

Insect Problems: The grower prefers to use a refuge in the bag corn hybrid since he's has little problem with European corn borer since he started using Bt corn hybrids. In some years, the grower has experienced a problem with silk clipping by Japanese beetles which impacted his final yield, corn ears fail to fill out completely due to pollination problems. **You are to assume that he will receive a scouting report that will state that silks are being clipped back to less than ½ inch before 50% pollination and that beetles are present and actively feeding.** The report will also state that pollen shed for an individual tassel generally takes 2-7 days to complete but for an intire field it takes 1 to 2 weeks (as per Dr. Bob Nielson, Purdue University). Japanese beetles can continue to re-invade fields but generally they are not an issue after pollination is completed. The rate of insecticide usually used by the grower is 2.1 fl oz of product per acre.

Another and new problem that the grower is concerned about is damage from Brown marmorated stink bugs. Corn is most susceptible to stink bug injury during ear formation before the tassel stage (VT). Stink bugs feed through the leaf sheath, causing a dead spot on the ear so that as the ear expands during the reproductive phase it becomes distorted and curves usually outward. This is often what growers get concerned about and would normally address this issue by spraying before VT at which time the use of a strobilurin fungicide has been shown to cause significant yield loss due to injury to the ear from the surfactants that are usually added to the spray solution. Feeding during silking and pollen shed (R1) will also kill kernels on the ear.

Once the ear has elongated, stink bug feeding during the blister and milk stages can blast individual kernels, usually causing them to abort or arrested development.

The grower **will receive** the following information from his crop scout. Prior to the VT or tasseling stage, the **Scouting Reports will state** that stink bugs are below threshold levels even at field edges where they normally are in greatest numbers. The Scouting Report around late R2 (Blister stage) and early R3 (Milk stage) will state that BM stink bugs are past threshold throughout many areas of the field and that a treatment is required. The common practice for treatment at this stage is the use of a rate of 5 fl oz or product/acre.

Soil Fertility: The grower has his samples tested at a regional private lab and that report is included below on a separate page with fertilizer prices. The grower does follow a nutrient management plan and limits his nitrogen (N) application to 1 lb N per bushel of expected yield. The grower prefers to apply 15 percent of his N at planting as a 2x2 starter with any additionally required P and K applied broadcast just prior to planting. The grower does not plan to use manure of any type as it is relatively unavailable in his area. The remaining N is applied as a sidedress dribble application using 40 percent of the total amount of N required. Sidedress N is applied when the corn is 12 to 18 inches tall and at least at the V5 growth stage. The remaining 45 percent of N is applied as three fertigation applications through the irrigation water. Two weeks after sidedress and each two weeks following, he applies in three fertigation applications 17.86%, 17.86%, and 9.3% of the total N requirement.

Seeding Rate and Hybrid Selection: With the improvement in hybrid performance and to obtain maximum yields, the grower has increased his seeding rate to 36,000 seeds per acre shooting for a final plant population of around 34,000 plants per acre on 30-inch row spacing.

Forward Pricing Contract: The grower has a forward price contract with the local grain elevator that guarantees him $4.25/bushel (delivered) for 400,000 bushels of corn which is about 90% of his usual irrigated production for corn. The grain elevator (grainery) also has stipulated that they will buy additional corn from him at the same price. The grower has a history of harvesting only after the corn has dried to an appropriate moisture level and therefore has not been docked on price in the past 10 years.

Pesticide Prices

Pesticide	Price	Container Size
Atrazine 4L (Aatrex 4L)	$14/gal	2.5 gal container
2,4-D Amine	$16/gal	2.5 gal container
Round-up (generic) Buccaneer Plus	$31/gal	2.5 gal container
Paraquat	$34/gal	2.5 gal container
Liberty	$86/gal	2.5 gal container
Granular Ammonium Sulfate (Penetrant for use with Liberty at 2.5 lb/acre)	$0.40/lb	
Dual II Magnum	$108 /gal	2.5 gal container
Cornbelt Premier 90 (NIS) Adjuvant (Sticker-NIS)	$37.80/gal	2.5 gal container
Cornbelt Crop Oil Concentrate	$12.37/gal	2.5 gal container
Headline SC	$410 /gal	2.5 gal container
Admire	$60/gal	1.0 gal container
Mustang Maxx	$130/gal	1.0 gal container
UPI's bifenture (generic Bifenthrin)	$60/gal	1.0 gal container

Note: Calculate your pesticide costs based on the rate of active ingredient you will use per acre as the grower can use any pesticide remaining in the container on his other fields.

Cost of Operations

Spraying—Pesticide Ground Rig	$9.07/acre
Spraying—Pesticide Aerial	$15.71/acre
Fertilizer Application—Dry	$8.28/acre
Fertilizer Application—Liquid	$9.01/acre
Fertilizer Application—Sidedress	$10.63/acre

Fertigation (30% UAN through Irrigation System)—No additional cost (included with water charge)

Lime Application (incl Lime)	$44.86/ton

No-till Corn Planting--(With or without fertilizer) $19.30/acre

Cost of Operations—Continued

Corn Planting—Conventional with fertilizer	$18.40/acre
Corn Planting—Conventional without fertilizer	$17.35/acre
Plowing--Chisel	$19.36/acre
Plowing—Moldboard	$24.67/acre
Disking with Cultipacker or Harrow	$18.70/acre
Cultivation	$17.70/acre
Irrigation	$25.00/acre inch
Combining Corn	$30.82/acre
Grain Hauling (local)	$0.19/bushel (cost to move from field to grainery)

Forward Contracted Grain Price

$4.25/bushel delivered (We will assume no discounts are charged to the grower)
Note: the grower is committed to a minimum of 400,000 bushels but the grainery will buy additional corn at this price.

AgroLabs, Inc. Soil Report Summary

Note: For this size field, six samples (0 to 6 inch depth) were submitted but the analyses were very similar across the zones sampled so the data presented below is the average of the six samples for the field. All samples were in the same category (Very low, Low, Medium, Optimum, High, or Very high) and would have very similar recommendations for fertilizer and lime.

Sample ID/Lab #	Soil pH 1:1	Buffer pH	Organic Matter %	Lime Require-ment	Mehlich 3 Phosphorus		Potassium		SO_4-S*	
					ppm P	Rating	ppm K	Rating	ppm	Rating
39562	5.7	6..5	2.25	0.5 ton/A	75	Optimum	64	Medium	5	Low

Sample ID/Lab #	Calcium		Magnesium		Zinc		Manganese		Boron	CEC
	ppm Ca	Rating	ppm Mg	Rating	ppm Zn	Rating	ppm Mn	Rating	ppm B**	meq/100g
39562	417	Medium	91	Optimum	8.6	Optimum	34.7	Optimum	1.25	3.5
Stated Yield Goal for this field is 280 bu/acre										

*SO4-S, Sulfur (S) deficiency is occasionally observed in corn grown on sandy, highly leached, low-organic-matter soils. Deficiency is most likely to occur under irrigated production practices where intensive management is employed to obtain maximum yields. Deficiency is less common on high-organic-matter soils or those with a history of manure application as both materials provide moderate amounts of plant-available S. Suspected S deficiency can be confirmed through tissue analysis of either a whole plant sample early in the growth cycle or later by analysis of an ear leaf sample collected at early silking. Early sampling does not always accurately predict S deficiency since the roots may not have penetrated to the subsoil reserves at that time. A critical component is often the N:S ratio in the tissue combined with the tissue S concentration. Ratios greater than about 16:1 and tissue concentration less than 0.12% S in the ear leaf indicate possible deficiency. If deficiency is suspected, an application of sulfate sulfur, should alleviate the problem.

**B, Soil tests are not very good at indicating a soil critical level for boron (B). Boron deficiency is occasionally observed in intensively managed, irrigated corn production. Boron applications are not, however, a general recommendation at this time. If a B deficiency is suspected, then tissue testing could be used to confirm the problem; and, if confirmed, apply 1 lb actual B per acre through the irrigation system.

Suggested Recommendations for Irrigated Corn at this Site:
Broadcast 0.5 ton of agricultural limestone (calcitic, if available) per acre prior to planting and as early as feasible
0 lbs of P_2O_5 are recommended for this site
145 lbs of K_2O per acre should be broadcast prior to planting
Sulfate should be applied at 48 lb SO_4-S
Nitrogen should be applied as split applications and should be at a rate of 1 lb N/bushel of expected yield.

Available Fertilizers, Analysis, and Prices per Ton

10-10-10	Mixed blended fertilizer	$535/ton
30-0-0	Liquid Urea Ammonium Nitrate Solution Density is 10.83 lb/gallon	$318/ton
43-0-0	Urea, prilled, with Agrotain	$495/ton
18-46-0	DAP (diammonium phosphate)	$550/ton
21-0-0-24S	Ammonium Sulfate, granular	$400/ton
0-0-0-23.5S	Calcium sulfate, refined	$320/ton
0-46-0	Triple superphosphate	$700/ton
0-0-60	Muriate of Potash	$450/ton
0-0-0	Calcitic Limestone	$45/ton applied
0-0-0	Dolomitic Limestone	$52/ton applied

Information relating to the Grower's Soil Fertility Management Practices from the Scenario:

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Agronomic Brand Corn Hybrid Seed

Rating Scale is 1= Excellent; 9 = Poor; -- Not available

Value-Added Traits:

CONV	**Conventional**
NON-GMO	**Not Genetically Modified**
RR2	**Roundup Ready® Corn 2 Tolerant**
LL	**Liberty Link® Corn**
CB	**Corn Borer Resistance**
RW	**Root Worm Resistance**
CEW	**Corn Ear Worm Resistance**
DT	**Drought Tolerant**
VIP	**Viptera**
RIB	**Refuge in the bag (5%)**

Product	Management			Growth Characteristics								Harvest	Diseases			
Agronomic Brand Designation	Value Added Traits	Relative Maturity	GDUs to Black Layer	Emergence	Seedling Growth	Root Strength	Stalk Strength	Drought Tolerance	Greensnap Tolerance	Plant Height	Ear Placement	Drydown	Northern Corn Leaf Blight	Southern Corn Leaf Blight	Gray Leaf Spot	Anthracnose Stalk Rot
AG D05-13	RR2, RW, RIB	117	2600	3	3	3	2	2	5	M	M-H	4	2	2	5	5
AG U457 HT	LL, CB, RW, CEW, DT	117	2500	3	3	3	2	3	4	M	M	4	2	2	5	5
AG PP909-GT	RR2, CB, RW, DT, CEW, RIB	117	2575	2	2	3	2	2	4	M	M	4	2	2	4	6
AG 444-X47	LL, RW, RIB	119	2650	2	2	3	4	3	4	M	M-L	4	3	2	4	6
AG GHT44-13	RR2, VIP, RIB	119	2695	3	2	3	2	3	5	M-T	M-H	4	2	3	5	6
AG QW 67-17	NON-GMO	122	2800	2	3	3	2	3	5	M	M	4	3	3	3	7
AG PZT77-HR	LL, CB, DT, RIB	122	2850	3	3	3	2	2	4	M-T	M	4	4	3	4	7
AG YG89-15	LL, VIP, RIB	122	2925	2	2	3	2	3	5	M-T	M	4	4	3	4	7
AG HD-44-12	RR2, CB, RW, CRW, RIB	124	2975	2	2	3	2	3	5	M	M-H	3	3	2	3	7
AG H455-DT	LL, CB, RW, RIB	124	3150	2	3	2	2	3	4	M-T	M-H	3	3	2	3	6
AG E445 HY-use	LL, VIP, DT, RIB	125	3300	3	3	2	2	1	2	M-T	M-H	3	4	2	2	6
AG 477D-15	LL, CB, DT, RW, RIB	125	3225	2	3	2	2	2	3	M	M-H	4	4	3	3	7
AG 955-DG	CONV, VIP	125	3250	3	3	2	2	3	5	M	M-H	4	4	2	3	7

Hybrid Name/ID	On-farm Yd Test 1	On-Farm Yd Test 2	On-Farm Yd Test 3	Mean of 3 Tests	Germination percent	Listed Price of Corn Seed* per bag+
	----bushels/acre at 56 lb/bushel and 13.5% moisture----					
AG 955DG	257	267	262	262	85	$225
AG D05-13	279	291	264	278	91	$325
AG HD-44-12	278	281	275	278	93	$329
AG U457-HT**	250	277	256	261	91	$310
AG PZT77-HR**	270	287	277	278	95	$320
AG QW 67-17	225	230	220	225	88	$195
AG 477D-15**	270	275	271	272	93	$295
AG E445 HY**-use	275	290	275	280	90	$275
AG YG89-15**	277	283	277	279	87	$290
AG PP909-GT	285	291	282	286	95	$375
AG 444-X47**	267	280	254	267	90	$300
AG GHT44-13	237	257	250	247	91	$312
AG H455-DT**	265	275	270	270	90	$310

*Agronomic Brand Corn Seed currently has a promotion available for Liberty Link corn hybrids [identified with two stars (**)] whereby the grower receives a 20% reduction in the listed price.
+Each bag contains 80,000 kernels.