Aggregate Costs and Benefits of USDA's Coordinated Rust Framework

A portion of the effort in developing and running the framework involves redirecting existing resources into activities that support the framework. Some of the salaries and overhead expenses are difficult to attribute to the framework, although without the framework, these funds would likely have been allocated to other activities. In 2005, USDA expected to spend $180,000 on six mobile survey teams to be deployed after the first confirmations of soybean rust in specific regions. USDA estimated that soybean rust diagnostic services would come to $45,000 for each of 26 States. The U.S. Government Accountability Office (GAO) (2005) surveyed 31 States, and the respondents reported a total estimated diagnostic cost of $703,180, or $22,683 per State in 2005. Finally, a spore deposition sampling program is expected to cost $300,000 in 2005 (USDA, 2005a). These data and estimates suggest a range of total costs for the coordinated framework of between $2,357,303 (GAO, 2005) and $4,355,000 (GAO, 2005; USDA, 2005a) for 2005. Measured against reported planting intentions, this cost comes to $0.03-$0.06 per planted soybean acre (USDA, 2005b).

Additional data provided by the National Program Office of USDA's Cooperative State Research, Education, and Extension Service (CSREES) included estimates of what USDA ($800,000) and the North Central Soybean Research Program (NCSRP) or United Soybean Board (USB) ($287,000) had actually spent on the sentinel plot program and an estimate of diagnostic lab spending ($600,000) in 2005. These updated estimates include updated allowances for labor costs. The total number of sentinel plots for 2005 is 906, 720 of which are funded by USDA and USB and an estimated 186 are funded by growers, agribusinesses, and State departments of agriculture. USDA (2005a) estimated that maintenance would take 1.6-2.4 hours per week per sentinel plot during the 3-4 months that the plots were to be maintained, which translates into roughly 17,000-34,000 extension specialist hours. These figures provide an estimate of the total cost of the coordinated framework for 2005 of between $2,632,000 and almost $5 million. These rough estimates of framework costs could be refined by identifying one-time fixed costs to build the framework separately from variable (annual and recurring) costs. Appropriate discounting could then be applied to the separate costs.

To approximate the coordinated framework's value of information in 2005, we aggregate estimated per acre values for individual regions. Table 3 provides these figures for each information quality level and scenario (base case, risk aversion, price feedback, and heterogeneous beliefs). We aggregate the values by multiplying each region's acreage by the per acre information value associated with the particular quality level and then sum across regions.

Aggregate values range from $11.2 million (base case) to $28.8 million (price feedback) for low-quality information, $81.2 million (heterogeneous beliefs) to $124 million (price feedback) for medium-quality information, and $210.1 million (heterogeneous beliefs) to $298.5 million (base case) for high-quality information. Although the information quality may in fact be higher in some regions than in others, these aggregate values should provide approximate values, depending on the framework's quality of information.

Risk aversion, price feedback, and heterogeneous beliefs all increase the lowest information values and reduce the highest information values compared with the base case but each for a different reason. This variation causes the ranking of values across scenarios to be different for different information qualities. For example, the base case scenario has the lowest aggregate value for low-quality information and the highest value for high-quality information.

Table 3
Aggregate information values for the U.S.

Scenario	Information quality		
	Low (0.2)	Medium (0.5)	High (0.8)
		Dollars	
Base case:			
U.S. total	11,247,380	113,715,650	298,521,730
Average per acre	.16	1.57	4.12
Risk aversion:			
U.S. total	16,870,790	119,851,600	233,582,010
Average per acre	.23	1.66	3.23
Price feedback:			
U.S. total	28,773,280	124,143.000	285,412,460
Average per acre	.40	1.72	3.94
Heterogeneous beliefs:			
U.S. total	16,777,090	81,237.100	210,149,490
Average per acre	.23	1.12	2.90