EnVesting in an Agricultural Legacy: Design and Implementation of a Targeted Young and Beginning Farmer Loan Program in Arkansas

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Abstract: U.S. agriculture has seen a decrease in of producers under the age of 35 entering agriculture for the past thirty years. This paper will explore the design and possible implementation of an innovative loan program designed give qualifying new young and beginning producers concessionary interest rates and loan fees for implementing of practices designed to improve on-farm profitability.

I. Introduction

The average age of America's agricultural producers continues to increase. According to the Census of Agriculture (Census) data, the average age of farm operators increased from 55.3 in 2002 to 57.1 in 2007. In Arkansas, the average age of farm operators increased from 54.9 in 2002 to 56.5 in 2007. The average age of U.S. farm operators has increased in each Census since 1982. In Arkansas, the average age of farm operators has been increasing in each Census since 1978. Why does the average age of farm operators continue to rise?

It can be seen in Table 1 that between 1974 and 2007, the number of farming operations managed by operators over the age of 65 increased from 421,471 in 1974 to 655,654 in 2007 in the U.S. This represents a 55.6 percent increase over that thirty-three year period. In Arkansas, the number of farming operations managed by an operator over the age of 65 increased from 8,827 in 1974 to 14,227 in 2007, a 61.2 percent increase in farm operators over the age 65.

Table 1: Total Number of U.S. Agricultural Producers per Age Group by Census Year, Source the 1974 – 2007 Census of Agriculture

Age Group	1974	1978	1982	1987	1992	1997	2002	2007
Under 25	52,418	66,575	62,336	35,851	27,906	20,850	16,962	11,878
25 to 34	239,674	285,420	293,810	242,688	178,826	128,455	106,097	106,735
35 to 54	983,059	977,123	948,832	866,063	811,079	838,171	938,970	834,219
55 to 64	552,175	588,584	536,402	495,816	429,839	427,354	509,123	596,306
Over 65	421,471	370,546	399,596	447,341	477,650	497,029	557,830	655,654
Total	2,248,797	2,288,248	2,240,976	2,087,759	1,925,300	1,911,859	2,128,982	2,204,792
Average Age	51.7	50.3	50.5	52	53.3	54.3	55.3	57.1

Mishra, Wilson, and Williams (2009) point out one reason for the decline in YBPs are the barriers to entry. YBPs face large initial investments and may not have the lending history or face higher interest costs to secure the large yearly operating capital requirements each year compared to older experienced producers who may have a lending and business history that allows them access to cheaper capital. Because of these barriers to entry, YBPs are unable to

gain the economies of size that older farmers experience and YBPs face higher cost structures than older farmers. YBPs are often looking for ways to reduce costs, increase profits, and reduce farming time in order to find ways to survive, such as taking off-farm jobs. This suggests a need to decrease financial pressures that may result in YBPs exiting agriculture or potentially foregoing enter into agriculture at all.

This article will focus on the potential effectiveness of an innovative pilot operating loan program (loan program) to be administrated by the three Farm Credit associations (FCBs) in Arkansas to increase the number YBPs successfully operating in agriculture. The focus of the loan program will be on YBPs who wish to adopt practices designed to meet environmental goals, while simultaneously maintaining or increasing farm profits. YBPs can select from a menu of production and management practices designed to improve environmental areas of (1) air quality, (2) water quality, (3) water quantity, and (4) soil fertility. Participating FCBs will reward YBPs adopting these good stewardship practices with concessionary loan rates and/or fees and terms to enhance their probability for future success, increase returns, and establish themselves as the next generation of farmers and ranchers and as future lending customers.

II. Discussion

A. Overview of Young and Beginning Producers

For FCB purposes, a young producer is defined as a producer under the age of 35. USDA defines a producer who has operated an agricultural operation for less than ten years as a beginning producer. Ahearn (2011) used the 2007 Agricultural Resource Management Survey (ARMS) data to determine that compared to established producers, beginning producers are more likely to be ethnically and racially diverse and more likely to be young, college-educated women. Ahearn and Newton (2009) found YBPs earn less income from their farms than

established operations and are more likely to earn more income from off-farm employment.

Mishra, Wilson, and Williams (2009) point out one reason for the decline in YBPs is barriers to entry to agriculture, such as facing large initial investments, do not have an established borrowing history, and have not gained the economies of size that established producers have. YBPs were 1.4 percent more likely to be financially distressed if they rented their farms than full owners; part owners were less likely to be financially stressed than full owners (D'Antoni, Mishra, and Chintawar (2009)). Factors found to positively influence YBPs financial performance include the YBP's being a part of a larger operation or a corporation, having a written business plan, participation in federal farm programs, and value-added processing their commodities. Katchova (2010) found that YBPs are similar to other groups of farmers, except that YBPs are less likely to experience problems with liquidity and efficiency based on personal and farm characteristics. USDA-ERS has found evidence that suggests YBPs in Arkansas and other states in the Mississippi Delta are more likely to operate more environmentally sensitive farmland compared to other groups based on a review of Environmental Quality Incentive Program (EQIP) contract data from 2006 in the Delta region of the U.S (Nickerson and Hand 2009). ERS found evidence that suggests 54 percent of beginning producers' EQIP contracts were located in areas with an above average percentage of highly erodible land.

Research conducted by the University of Arkansas also shows that beginning farmers and ranchers have lower survival rates in agriculture. Data from FSA's farm loan programs indicate 47.5 percent of beginning farmers who received operating loans through FSA left farming voluntarily for reasons other than death or retirement upon exiting the program compared to 34.6 percent of regular recipients of operating loans from FSA (Dixon, et al. 2007). Beginning

farmers also have a higher percentage of FSA operating loans terminated due to foreclosure, bankruptcy, or debt write-off than established operating loan borrowers, 9.6 vs. 8.5 percent for one-year operating loans and 16.1 vs. 7.4 percent for seven-year loans (Nwoha, et al., 2005).

B. Program Design

The proposed loan program designed in this study has the goal of increasing the number of YBPs successfully operating in agriculture by increasing their financial stability and operating margins, simultaneously fulfilling certain identified environmental and social goals. The loan program is designed to help producers at or slightly above break-even to select and implement practices from a menu of select activities, with a FCB simultaneously giving them concessionary interest rates and/or loan fees for implementing the practices. This loan program would help YBPs become profitable, reduce a single FCB's risk on lending to this group of producers, and create a new class of potential borrowers who need assistance to become successful.

1. Requirements to Enroll

Before enrolling in the loan program, each potential participant would need an existing and actionable conservation plan on file with his or her local USDA-NRCS office and an irrigation water management plan, nutrient management plan, and pest management plan. First, the potential participant would need an existing actionable conservation plan . Discussions with state NRCS officials Corey Farmer, Resource Conservationist, Rich Joslin, Resource Conservationist, and John Lee, Agronomist, a YBP would become aware of conservation issues on their farmland and ways to address and improve these conservation issues over time. Being aware of the conservation issues and knowing how to address them increases the chances of the farmer successfully dealing with these conservation issues over time.

Potential participants would also need to work with their local county Extension agent, local NRCS officials, or a certified crop advisor to develop actionable irrigation water management, nutrient management, and pest management plans as defined by USDA-NRCS, 2012, before enrolling in the loan program. Having each of these plans would also insure that a potential participant is serious about implementing practices from the menu. Potential participants would understand the importance of nutrient application timing and source, how to efficiently irrigate crops, and the uses of alternative pest management strategies before using costly chemicals.

2. Menu of Practices

a. Technology Adoption Among YBPs

The adoption of menu practices for the loan program would require potential participants to adopt new forms of technologies in their operations. Mishra, Wilson, and Williams (2007) using the ARMS survey to determine the impact of the use of technology on the financial performance of YBPs. The analysis found that adoption of GM seed did lead to higher financial performance. Adhikari, Mishra, and Chintawar (2009) used weighted regression analysis on the 2004-2006 ARMS data to evaluate technology adoption, such as the adoption of GM seed, by YBPs and the effect of the technology on financial performance. The analysis found that younger YBPs and YBPs with more education were more likely to adopt technology. This study was limited to the adoption of GM seed by YBPs; results may not be the same for adoption of other technology and newer farming practices.

b. Selection of Practices

Practices being considered for inclusion in the pilot loan program for row crop producers must demonstrate two things. First, the practices must address one of four environmental

concerns (1) water quality; (2) water quantity; (3) air quality; and (4) soil quality. Improving production practices connected with these areas of concern would help the loan program meet environmental goals and address public concerns. Second, the practices must be proven to either maintain or increase farm profits. Working with program participants to positively address environmental concerns would create a core group of producers that use profitable best management practices to simultaneously produce food and improve the environment.

i. Conservation Tillage

Conservation tillage can potentially reduce the amount of irrigation water needed (Anders, et al., 2003). Matekole, Westra and Appelboom (2009) found that when comparing tillage systems producers would prefer no-till systems because of the higher returns per acre and the lower nitrogen runoff. Variability in returns and probability of negative returns were also found to be smaller with no-till systems. The variability in returns was also smaller for the no-till system compared to the other two systems (Watkins, et al., 2010 and Watkins, Hignight, and Anders, 2011). A FCB loaning to a YBP participating in the loan program could see additional opportunities to loan capital to a YBP for purchasing a large sprayer and specialized planting equipment for conservation tillage.

For cotton production, Hanks and Martin (2007) found the five-year net returns were the highest using no-till followed by conventional tillage and low-till sub-soiling. Nyakatawa, Reddy and Mays (2000) found that implementing no-till cotton production with the use of poultry litter and the use of a cover crop of winter rye before planting produced higher yields compared to minimal till cotton. Evaluating production methods for soybeans in Arkansas, Popp, Keisling, Oliver, Dillon, and Manning (2001) and Popp, Keisling, Manning, and Annis, Jr. (2001) found that no-till soybeans in Arkansas performed better than pre-plant tillage soybeans

on test plots in clayey soils located at Keiser, Arkansas. For winter wheat pasture, Watkins, et al. (2010) found that the no-till system produced the highest average total returns followed by reduced tillage and conventional tillage.

When a crop rotation is included with no-till, Hignight, Watkins, and Anders (2009), Hignight, Watkins, and Anders (2010), and Watkins, Hignight, and Anders (2011) have found that NT when used with crop rotations traditionally used in Arkansas can increase net returns per acre when compared with CT with the same crop rotations. Verkler, et al. (2009) studied the impact of tillage, burning of residue, and irrigation on soybean yields in Eastern Arkansas. The greatest net returns were found with the irrigation, low nitrogen to residue level, no-till, and burned residue treatment. Watkins, Hill, and Anders (2008) looked at the profitability of NT rice compared to CT rice with regards to five common rental arrangements in Arkansas and found that NT rice had larger net return compared to CT rice for all five-rental agreements analyzed. Variability in returns and probability of negative returns were also found to be smaller with no-till systems. The variability in returns was also smaller for the no-till system compared to the other two systems (Watkins, et al., 2010 and Watkins, Hignight, and Anders, 2011).

ii. Integrated Pest Management

Development of a pest management plan can help to reduce chemical costs, limit chemical applications to when the applications are necessary, and promote the use of cheaper non-chemical pest management alternatives. Development of an IPM plan may be a barrier to entry for a potential YBP to participate in the loan program and can take time and require a YBP to work with an extension expert or a crop advisor in developing the plan. Fernandez-Cornejo, Jans, and Smith (1998) provide a thorough literature review on the profitability of integrated pest management (IPM) practices. Use of IPM on cotton and soybeans had twenty and seven

published studies, respectively, that showed profits and yields increased generally with the implementation of IPM practices. Corn has also shown increased profits and yields with IPM implementation.

iii. Riparian Buffers

The effect on profitability from riparian buffers has received some attention in previous studies. A FCB loaning to a YBP adopting this practice could potentially see additional lending for establishment of buffer strips. Bonham, Bosch, and Pease (2004) and (2006) analyzed the whole-farm impact of mandatory nutrient management plans and riparian buffers in the Chesapeake Bay region. The best results of total gross margin of $787/acre came when no riparian buffers or nutrient management plan were required, but requiring the use of riparian buffers only reduced total gross margins by $20/acre.

Stull, Dillon, Shearer, and Isaac (2004) analyzed the economic impact of implementing riparian buffers, using yield monitors, and enrolling the buffers in Conservation Reserve Program (CRP) in Kentucky on a soybean/wheat and corn rotation over two years. Use of yield monitors, CRP enrollment, and buffer strips increased net returns by $373.25 compared to no strips and by $1,025.83 compared to enrolling all eligible strip areas in CRP for all three fields.

iv. Cover Crops

Arkansas NRCS officials have found that Arkansas farmers are not likely to adopt cover crops based on a stigma associated with the practice (Lee, et al. 2011). A FCB would have to be willing to lend additional operating capital to a YBP for the planting of a cover crop. Planting a cover crop can improve water infiltration rates and the moisture content of soils, breaking up soil compaction and improving soil quality, increasing soil organic matter, and reducing topsoil loss

(Bergtold, et al., 2012). Cover crops can also protect water quality, reduce weeds, and improve the productivity of the traditional cash crops grown by a producer (Bergtold, et al., 2012).

Studies had found that no-till along with the adoption of a cover crop could increase gross margins Gareau (2004) . Lu, Teasdale, and Huang (2003) used data from the USDA's Agricultural Research Service's Sustainable Agricultural Demonstration site at Beltsville, Maryland to construct a 60-year simulation comparing the profitability of six cropping practices. A cover crop with no nitrogen fertilizer applied had the highest gross margins. Hanks and Martin (2007) found net returns to cotton with the use of a winter wheat cover crop decreased with either no-till or low-till sub-soiling by $12/hectare and $49/hectare, respectively.

v. Laser Leveling

Laser leveling reduces irrigation water needs and would also compliment the adoption of no-till in a YBP's operations but may be cost prohibitive. The high cost of adopting laser leveling is a substantial barrier of entry for a YBP. The large initial investment to laser level can be quickly recovered if a YBP experiences no yield loss, but if a yield loss is experience the payback period could take years. Although some government conservation programs provide cost-share money for a producer to adopt laser leveling, the level of funding in these programs maybe cut dramatically in the next Farm Bill and this cost share money may not be available to assist a YBP in adopting this practice. A FCB looking at loaning to a YBP participating in the loan program and adopting laser leveling could see additional lending opportunities for the costs of laser leveling.

Laser leveling impact in Eastern Arkansas on rice and soybean rotations has been the focus of Wailes, et al. (2003), Popp, et al. (2003), and Popp, et al. (2004). In Wailes, et al. (2003), found laser leveling in Arkansas could increase net present value of returns by $608 per

acre with adequate groundwater from a calculated baseline and from $535 to $674 per acre with inadequate groundwater from the calculated baseline. Watkins, Hill, and Anders (2007) studied the benefits and costs of switching from a contour-levee system to a precision leveling system in Arkansas. A leveled rice or soybean system produced higher net returns per acre compared to contoured systems, by $123.56 and $48.85 per acre.

vi. Underground Pipe

Adoption of underground irrigation pipe can also help to reduce losses from evaporation experienced with furrow irrigation. One barrier to adopting this practice for a YBP is the large cost of implementing the practice. Federal programs are available to cost-share the adoption of underground irrigation pipe, but the levels of this cost-share funding are uncertain at this time.

Impacts of underground irrigation pipe were analyzed in Wailes, et al. (2003), Popp, et al. (2003), and Popp, et al. (2004). Wailes, et al. (2003) found with the adequate groundwater, use of underground irrigation pipe increased net present value of returns per acre by $103; with inadequate groundwater, net returns per acre increased by $144 when used with a reservoir and tail-water recovery system. With inadequate groundwater situation, the costs to install the irrigation pipe are $94/acre compared to the benefits of $144/acre.

vii. Crop Rotations

Arkansas farmers do utilize crop rotations, but based on conversations with state NRCS officials, the rotations used by farmers in Arkansas are based on market prices and equipment available rather than agronomic or conservation considerations (Lee, et al., 2011). Proper crop rotation systems would reduce impact of pests and diseases and increased returns per acre. A FCB lending to a YBP adopting this practice would see additional lending opportunities for a YBP to gain the additional equipment, either through direct purchasing or leasing the equipment.

Dillon, et al. (1997) studied seven crop rotations, involving soybeans, wheat, and grain sorghum, and eleven production management systems using either no-till, conventional tillage, or burning wheat stubble. The highest returns per acre were with conventionally produced, double-cropped wheat-soybean rotation at $136.99 per acre and the lowest returns were with continuous no-till soybeans at $39.44 per acre. Anders, et al. (2002) studied the impacts of rice yields on various tillage practices and ten different crop rotations in 2001 and 2002. In 2001, the highest net returns per acre were found with the no-till corn-rice rotation at $246.21 per acre. In 2002, a rice-corn-soybean rotation had the highest bushels per acre of rice and a continuous rice rotation had the lowest bushels per acre.

vii. Irrigation

Truman and Nuti (2010) found that the use of furrow diking could reduce supplemental irrigation, increase water capture, and reduce sedimentation losses and rainfall runoff in Georgia. For areas of the Southeast with runoff producing rains during crop growing seasons, the implementation of furrow dikes could be a cost effective practice from a financial and natural resource conservation standpoints.

Using either the *Checkbook User's Guide* or the *Irrigation Scheduling* computer program provided by University of Arkansas Extension Service would allow a YBP to efficiently apply irrigation water when needed by the crop and present low barriers to entry with a YBP only needing a computer and the ability to keep records of daily temperatures and rainfall amounts. Adoption of other irrigation practices, such as furrow dikes, would present barriers to entry from the cost of adoption. With the adoption of other irrigation practices, a FCB could see additional lending opportunities for the operating capital necessary to implement the practice.

ix. Nutrient Management

Gandonou and Dillon (2007) modeled the impact of variable rate technology (VRT) applications of fertilizers compared to uniform application rates of fertilizers in the production of soybean, wheat, and corn. Results indicate VRT did improve comparative profitability as fertilizer and/or fuel prices increased compared to uniform application. In Arkansas, VRT applications of P were found to be more profitable compared to a uniform application of P when the farm contained a majority of silt loam soils, a majority of clay soils, or a silt loam-clay soil with a rice-soybean rotation (Popp and Griffin, 2000). A FCB could see potential lending opportunities here in additional lending for a YBP to purchase their own sprayer and equipment necessary to adopt VRT, this could be something a YBP considers if they are purchasing a sprayer to use in a no-till operation.

x. Carbon Sequestration

As of the writing of this paper, the Chicago Climate Exchange has ceased to trade carbon credits. Without a market for the trading of carbon credits, adoption of carbon sequestering practices by themselves will not be a viable option for producers. Certain practices, such as no-till, that sequester carbon and reduce production costs and increase profitability, will still be considered by a participating YBP. Other carbon sequestration practices that rely on a carbon market to be profitable would not currently be considered without the creation of a new carbon trading market in the U.S.

xi. Urea

Proper applications of urea or other nitrogen sources could have potential impacts on a participating YBP's profitability. Norman, et al. (2004) studied the impact of urea, Agrotain urea, ammonium sulfate, and urea/ammonium sulfate blend on ammonia volatilization loss and yields based on application time and delays in flooding rice in 2002 and 2003. Best results were

from using Agrotain urea or ammonium sulfate, producing the highest yields with flooding delayed 5 to 10 days after application. Golden, et al. (2009) studied the impacts on rice yield and nitrogen uptake of rice with the use of polymer-coated urea (PCU) fertilizers in a delayed-flood, direct-seeded production system and found PCUs are not viable alternatives in direct-seeded, delayed-flood rice, but may have uses as a pre-plant nitrogen source for water-seeded rice.

3. Recommended Practices Chosen for Menu

Environmental impacts of each practice were considered practice selection. The Conservation Practice Physical Effects (CPPE) score developed by NRCS was used to determine the environmental impact, based on interviews with Arkansas NRCS officials. The CPPE is between -5 to +5 given for the effect each practice would have on a natural resource concern area and is used by NRCS in EQIP rankings. The natural resource concern areas were narrowed down from seventy-four areas to nineteen areas that met the environmental areas of concern in this study. CPPE values available for program practices were then found for each practice, the points totaled, and the ten practices with highest CPPE totals were considered for inclusion (Table 2).

The ten practices which maintained or increased farm profitability, had the largest environmental impact based on the practice's total CPPE score to be included in the menu of practices for the initial loan program are: (1) conservation tillage; (2) integrated pest management; (3) buffer strips; (4) use of cover crops; (5) precision land leveling; (6) underground irrigation pipe; (7) use of crop rotations; (8) tailwater recovery systems; (9) planting appropriate seed varieties; and (10) planting and irrigating according to the standards found in the Arkansas crop production handbooks for rice, wheat, corn, soybeans, and sorghum.

4. Concessionary Interest Rates and Loan Fees

For adopting these selected practices, the qualified participant would be rewarded by the FCBs with concessionary interest rates and/or loan fees. By reducing either loan fees or interest rates, the FCBs would be working to insure the financial stability of YBPs and create new long-term costumers for the FCBs. Creating a group of new and successful long-term borrowers would also insure in future success of FCBs as experienced producers retire.

This loan program would complement many of the programs already in place for YBPs by the various FCBs. Many FCBs are already doing concessionary interest rates or loan fees on operating loans being made to YBPs to help get their start in agriculture. In many cases, the FCBs could use their already established concessionary interest rate operating loan programs for YBPs and simply add a requirement of adopting practices from the menu of practices.

Although discussions with various officials from the FCBs make it clear that the FCBs can 'pigeonhole' many borrowers into the FCA's YBP mandates, but this program would be geared towards YBPs and help meet the mandates without 'pigeonholing.' This loan program could be used to draw in a new pool of YBPs who currently may not be borrowing from the FCBs but are looking for a new lender that can help this new pool of YBPs become more financially competitive through the loan program and create long-term FCB borrowers.

One issue in having YBPs adopt practices as a part of receiving their operating loan is monitoring and policing to make sure practices are adopted. The majority of the practices included in the loan program qualify for funding under NRCS conservation programs, so FCBs could work with local NRCS personnel in their area to help monitor to ensure the practices are being properly implemented, thereby reducing implementation monitoring costs to FCBs.

D. Program Implementation

Researchers at the University of Arkansas would work with representatives from Farm Credit Services of Western Arkansas, AgHeritage, and Delta Farm Credit to initially implement the loan program as a three-year study. The three-year study would allow researchers to assess the loan program's impact on the participating YBPs. The goal is to use the three-year study period as a time to fully develop a more effective program that truly benefits YBPs and helps them succeed.

To implement the loan program as a three-year study, FCBs would randomly select forty YBPs for possible inclusion in the program. YBPs that would be included are those YBPs currently making their payments but falling short of breaking even would potentially be eligible for the initial sample group. The FCBs would be allowed to select the forty YBPs because the FCBs are in a much better position to know the financial condition of their YBP borrowers. Many FCBs require YBPs to annually present financial statements and they would also be in a better position to determine who will be serious about participating in the loan program for three years. The researchers would then randomly select twenty of the forty YBPs for inclusion in the initial sample group to be given concessionary interest rates and fees in return for adopting practices from the menu and the remaining twenty YBPs would be placed in a control group that would not participate in the loan program.

After the initial three-year study, the researchers and the three FCBs would be able to determine which portions of the loan program were successful in transforming the sample group into successful producers. The initial study would allow both the researchers and the three FCBs to work together and make changes necessary for the loan program to continue and be a successful program for YBPs. If the loan program proves successful in increasing YBP profitability and retention in agriculture, the next goal would be to seek national adoption of the

loan program by either individual FCBs in other states or through the FCA. To implement the loan program in another state, each FCB would need to consider including practices for crops grown in that state, practices shown to improve their selected areas of concern, and practices shown to maintain or increase profitability of the operation.

III. Summary and Conclusion

Research has shown that one reason for the decline in YBPs is due to barriers to entry due to large initial investments and higher costs to the large yearly operating loan requirements, compared to older more established producers. The initial loan program has the potential to be successful in helping reduce lending costs and improving profitability for YBPs. Producers in the loan program would be awarded concessionary interest rates and/or fees for adopting selected ten selected best management practices focusing on improving in areas of societal concern. The concessionary interest rate and loan fees would be similar in nature to those currently being offered to YBPs through current lender programs. The main difference from current YBP programs offered by the FCBs would be the requirement of adopting practices to help increase YBPs' profitability. The reduction in interest rates and loan fees along with practices to increase profitability would work to increase a YBP participants profitability and work as an incentive to retain them in production agriculture.

Table 3: Modified CPPE Scores for Ranking Practices Natural Resource Concern		Conservation Crop Rotation	Cover Crop	Field Border	Filter Strip	Irrigation Land Leveling	Irrigation System, Sprinkler	Irrigation System, Surface and Subsurface	Irrigation System, Tailwater Recovery	Irrigation Water Conveyance, High Pressure Underground	Irrigation Water Conveyance, Low Pressure Underground	Irrigation Water Management	Nutrient Management	Pest Management	Residue Management, Seasonal
Aquifer Overdraft - Water Quantity		1	1			1		1	3			4			1
Inefficient Water Use on Non-irrigated Land - Water Quantity		2	2	1		5	5	3	5	4	4	5		1	1
Reduced Storage of Water Bodies by Sediment - Water Quantity			2	2	5	1	3	1	3	1	1	3		1	2
Excessive Nutrients & Organics in Groundwater - Water Quality		2	2	2	3	2	1	1				3	5		-1
Excessive Nutrients & Organics in Surface Waters - Water Quality		2	3	3	5	2	2	1	2	1	1	3	5		1
Excessive Suspended Sediment & Turbidity in Surface Water - Water Quality		2	3	3	5	1			2	1	1	3		2	1
Harmful Levels of Pesticidies in Groundwater - Water Quality		2	2	2	1	2	2	1	2		1	3		5	-1
Harmful Levels of Pesticidies in Surface Waters - Water Quality		2	3	3	3	2	2	1	2			3		5	
Soil Erosion: Irrigation - Induced - Soil Erosion		3			1	3	3	-1		2	2	3	-1	3	2
Soil Erosion: Sheet & Rill - Soil Erosion		4	5	4	1	1								3	2
Compaction - Soil Condition		2	3	3	5	-1	-1	-1					-2	2	
Contaminants - Residual Pesticide - Soil Condition		3	2	2	2			2						3	
Contaminants - Salts and Other Chemicals - Soil Condition		2	1	1	1	-1							2		1
Organic Matter Depletion - Soil Condition		4	3	4	5	-1	1					1	2	2	1
Contaminants: Commercial Fert. - N - Soil Condition		4	2	2	2								2		
Productivity, Health, & Vigor - Plant Condition		4	2	5	5	2	3	3	3	3	3	3	3	5	2
Habitat Fragmnetation - Fish & Wildlife		2		2	1										
Chemical Drift - Air Quality		2												5	
Particulate Matter Less than PM 10 - Air Quality		2	3	1	1		2	2				3	2	2	2
Total Points		45	39	40	46	19	23	14	22	12	13	37	18	39	14

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