

**Environmental Groups Identify
Barriers to Agriculture in Adopting Water Quality BMPs**

Terrie Clark, Project Coordinator (graduate student)
Department of Communications
301 Umberger, Kansas State University
Manhattan, KS 66506-3402
(785) 532-2889 (voice); (785) 532-5633 (fax)
terriec@ksu.edu

Dr. Steven G. Hill, Assistant Professor
Department of Communications
301 Umberger, Kansas State University
Manhattan, KS 66506-3402
(785) 532-5804 (voice); (785) 532-5633 (fax)
shill@ksu.edu

Dr. Ted Cable, Professor
tcable@ksu.edu
Department of Horticulture, Forestry and Recreation Resources
2021 Throckmorton, Kansas State University
Manhattan, KS 66506-5506
(785) 532-1408 (voice); (785) 532-6949 (fax)

Dr. Kris Boone, Professor and Interim Head
Department of Communications
301 Umberger, Kansas State University
Manhattan, KS 66506-3402
kboone@ksu.edu

Pat Melgares, Marketing Coordinator
Department of Communications
301 Umberger, Kansas State University
Manhattan, KS 66506-3402
melgares@ksu.edu

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Abstract

In October 2000, Kansas initiated a water quality program to determine total maximum daily loads (TMDLs) by river basin. This research helped assess that program seeking to identify barriers agricultural producers face in adopting water quality best management practices (BMPs). Data from environmental groups were complementary to focus group research with community leaders. Ultimately the project aims are to help develop a strategic communications plan to help create awareness of water quality issues and to promote BMPs. Most research explaining adoption of conservation practices has been based on adoption-diffusion model and psychological environmental research showing attitude as predictive of behavior. However, attitudinal studies have shown environmental concern or attitudinal variables do not correspond to behavior (Tanner, 1999). In this study, the reasons for non-action or intervening events that act on intention and behavior (Theory of Planned Behavior) define the barriers/constraints that agricultural producers face. Intervening events also indicate approaches for affecting behavior. Recent research in Switzerland (Kaufmann-Hayoz & Gutscher, 2001) suggests new approaches that complement or replace classical approaches for promoting environmentally positive behavior with ones relying on voluntary and cooperative action, and are available to all actors. To be more inclusive of all stakeholder groups, research using semi-formal interviews was conducted with three Kansas environmental groups. Data were coded and analyzed using a grounded theory approach. In addition to barriers faced by individuals, the study identified some larger social structure barriers that need to be overcome. The data in this study corroborates the data obtained from the focus group study (Hill et al. 2005) with little difference.

Key words: water quality, Theory of Planned Behavior, sustainable, TMDLs, BMPs, barriers

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Introduction

State efforts to improve water quality in Kansas are currently driven by the requirements of a 1998 lawsuit requiring Kansas to develop Total Maximum Daily Loads (TMDLs) for water quality impairments on the Environmental Protection Agency's 303d list. In October 2000, Kansas State Research and Extension and USDA/NRCS began a voluntary compliance approach to develop TMDLs by river basins. The goals of the program were to build awareness of water quality issues, identify impairment sources, and demonstrate, promote and implement best management practices (BMPs) for water quality improvement and protection. The program included assigning seven watershed specialists to high priority TMDL watersheds to implement the program.

To help assess that TMDL program, research by Hill, Clark, Cable, & Boone (in review) sought to identify the barriers or constraints that agricultural producers face in adopting water quality BMPs, and to identify possible solutions to overcome the barriers. Their eventual goal was to help develop a strategic communication plan to assist the watershed specialists in creating awareness of water quality issues and promoting use of BMPs. Focus groups with community leaders found that barriers and associated approaches to solutions clustered into four theme areas: knowledge, awareness, and understanding; strong relationships; ownership of issues; and enforcement. In addition, a fifth and key barrier identified was money; a fifth key approach was place/home/community (Hill, Clark, Cable & Boone, in review). Community leaders, however, represent only one group of stakeholders. Researchers also conducted interviews with "expert

sources” from state agencies that address water issues. These interviews included sources from the Kansas Department of Health and Environment, Kansas Department of Agriculture, Kansas Natural Resource Council, Kansas Water Office, and the watershed specialists. The researchers questioned that the knowledge and perceptions of the expert sources and community leaders may not be representative of all stakeholder groups. To be more inclusive of knowledge and perceptions about barriers and possible solutions and as a check on the data, the research team interviewed representatives of three Kansas environmental groups. Groups interviewed were Kaw Valley Heritage Alliance, Kansas Alliance for Wetlands and Streams, and Friends of the Kaw. The objective of this study was to obtain from these environmental groups their insight regarding Kansas water quality, existing barriers, and possible approaches to mitigate those barriers. Specifically, the groups were asked what they perceived to be the barriers to achieving water quality goals in Kansas, what they perceived as barriers to agricultural producers in adopting positive water quality management practices, and what might be possible approaches to overcome these barriers.

A review of the literature shows that since the 1950s, research has focused on the adoption-diffusion model to explain how agricultural producers have adopted conservation practices. This model explains conservation practices through individual action while ignoring the social and economic factors such as financial cost to the farmer or relevance to a specific farm structures (Clearfield & Osgood, 1986). Similarly, previous psychological environmental research has concentrated primarily on environmental concern or attitudes as predictors of environmental behavior. Those seeking to change environmental behavior assumed that education and information would change people’s attitudes and beliefs and thus their behavior.

Attitudinal studies have shown that environmental concern or attitudinal variables do not correspond to behavior (Tanner, 1999).

Given the findings that attitude does not correspond to behavior, Tanner addressed the question of how to promote adoption of behavior. Her 1999 study focused on why people do not adopt or why they take no action. She found non-action may be due to the lack of opportunity or motivation, even though individuals have a positive environmental attitude and intend to act. Performing a behavior requires that it be physically possible, salient as an option for the individual, and relevant to the individual. These reasons for not acting are (for purposes of this study) equivalent to barriers or constraints to adoption.

The Theory of Planned Behavior (Ajzen, 1991, 1985) posits that intention is central to behavior; however, intention may be influenced by salient information and behavioral, normative, and control beliefs. Other factors (or intervening events) can affect behavior by acting on an individual's system of beliefs that affect intention, or by directly affecting intention, actual behavioral control, or the behavior. Even with a positive environmental attitude and intention to act, individuals may lack opportunity or motivation. The behavior must be physically possible, a salient option and relevant for the individual (Ajzen, 1991, 1985). In this study, the reasons producers have for not taking action or intervening events define the barriers/constraints that agricultural producers face in adopting water quality BMPs. These intervening events also indicate approaches for affecting behavior.

Although, according to Morse (1991), farmers and environmentalists tend to have the same goals – clean air, clean water, and good soil – conflict tends to arise from their different philosophical approaches to achieving those goals. Traditional U.S. farm policy has been one of relying on voluntary adoption of environmentally friendly production practices. Policy

approaches to encouraging reduction of environmental impacts by farm practices have included moral suasion and education, economic incentives, research and development, and direct regulation. To encourage adoption, these policies have used such tools as extension education, technical assistance, and cost share programs (Bosch, Cook, & Fuglie, 1995). Moral suasion and education rest on the premise that farmers will voluntarily adopt environmentally friendly practices if fully informed about the economic and environmental consequences of their current practices. Although economic incentives may include taxes on inputs or fees on observable pollutants, they also include subsidies to help producers defray the financial cost of implementing farming practices that promote environmental quality.

Similarly, research in Switzerland (Kaufmann-Hayoz & Gutscher, 2001) has presented a model to encourage environmentally positive behavior and sustainable development that coincides with the traditional farm policy in the U.S. The Swiss research has shown that policy must incorporate ecological, economic, and socio-cultural dimensions to accomplish environmental goals and encourage sustainability. This research divided approaches into two categories: “classical” and “new” policy instruments. Classical instruments are regulatory (or “command and control”) and economic or financial instruments. The classical approach has lacked efficiency because regulation is difficult to implement and enforce. This inefficiency implies a need for new instruments. The Swiss model adds approaches that complement or replace classical approaches with those that are available to actors other than authorities; these approaches rely on voluntary and cooperative action. New instruments fall into categories of service and infrastructure, collaborative agreements, and communication and diffusion.

As do U.S. government agencies, farm groups like the National Association of Conservation Districts look to achieve environmental goals through education, technical

assistance, and economic incentives. Farm groups view environmentalists as proponents of enforcement, taking the “big stick” approach. In 1990, the U.S. government seemed to make a move toward more regulations; the 1990 Coastal Zone Act Reauthorization Amendment is one such act. It requires states in coastal areas to develop a set of “best management practices” and land-use controls to reduce nonpoint source pollution. The act also obliges these states to enforce the use of best management practices by farmers in sensitive coastal areas (Bosch, Cook, & Fuglie, 1995).

Although 1990 saw a move toward more enforcement through regulation, the yearlong talks that resulted in the 1990 Farm Bill also saw agriculturists and environmentalists come together on compromise provisions that allowed for agricultural productivity and economic incentives within a framework that offered environmental protection. Agriculture will have to continue addressing environmental concerns if it wants a continued say in the decision-making process. Maintaining such a role will allow farmers the opportunity to better shape legislation that will affect their lives (Morse, 1991). Cost of environmental compliance worries farm groups; many practices that are good for the land cost more.

Despite ideological differences, agriculturists and environmentalists are addressing the same issues – air pollution, water pollution, and soil erosion. For this study, three environmental organizations were included in the discussion to assess barriers and possible solution approaches to achieve better water quality in Kansas. Specifically, the groups were asked:

1. What are the barriers to achieving water quality goals in Kansas?
2. What do you perceived as barriers to agricultural producers in adopting positive water quality management practices?
3. What might be possible approaches to overcome these barriers?

Method

Representatives of three Kansas environmental groups were interviewed for their perspectives on water quality issues in the state, what they see as barriers for agricultural producers' adoption of positive water quality practices, barriers to addressing water issues in general, and how these barriers can be overcome. To provide continuity of the data, the question route used for these interviews and the subsequent analysis closely followed the question route and analysis used for the community leader focus groups (Hill, et. al., in review).

Interviews from the environmental groups were transcribed, and then coded using NUD*IST analytical software and a grounded theory approach to identify primary themes (Glaser & Straus, 1967). Data were grouped into categories that resulted from thorough analysis and coding in the previous focus group study (Hill et al., in review).” The final analysis categorized the specific barriers and approaches and their corresponding salient quotes into the same general themes as the focus group data. Data were compiled into similar analytic summary tables. The barriers and approaches were labeled to indicate the type of barrier being addressed: intrapersonal (internal), interpersonal (socially related), or structural (factors external to individuals, such as cost, program availability, lack of technical assistance, etc.) (Jackson & Scott, 1999). They were also labeled to show where in the model of TPB intention would be affected, and the instrument, from the Swiss model that might be used in the approach.

Results

Data from interviews with three environmental groups did not result in significant variations from general themes identified in the focus group study (Hill et al., in review) – with one exception. Four general themes emerged from the data for both barriers and approaches that

mirrored themes from the earlier study: money; knowledge, awareness and understanding; strong relationships; ownership. As barriers, these themes express a negative attribute and as approaches, a positive attribute. Three additional approach themes were identified: place/home/community, enforcement, and effectiveness of state efforts.

Barriers

As would be expected, **money** was immediately identified as a barrier for agricultural producers. One statement suggested that paying producers to implement BMPs was a means to subsidizing farmers and these payments represented a public or social cost, and questioned the appropriateness of this practice. Similarly allowing industry to continue practices that are detrimental to water resources (e.g. dredging sand from river beds) because they have been doing it for many years was also questioned. Comments generally centered on the cost to producers of implementing BMPs, cost to municipalities in complying with regulations, and the use of financial incentives to ease these burdens. In addition to specific lack of money, other cost barriers included time and maintenance requirements, limits to management options, limits to sale opportunities, and cost to municipalities. Barrier themes are summarized in Tables 1 through 4.

Table 1 Barriers Theme: Money

Barrier	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Lack of Money	How much it's going to cost people to implement the practices that are going to do the most for water quality.	Intra-personal	Perceived Behavioral Control	Economic
Time and maintenance	I heard a lot of "I'm not going to fence..." because who's going to maintain those fences? Who's going to be walking them and who's going to pay for them?	Intra-personal	Attitude	Communication & Diffusion / Economic
Limits management flexibility	The process can take a number of years to get the money turned around. Meanwhile, they may get the itch to change their whole use for that particular parcel and they feel like they can't...	Structural / Intra-personal	Attitude	Service & Infrastructure / Collaborative Agreements
Questioning farm subsidies	Why are we paying people to do what they should be doing anyway so – we're paying them because they need the money to survive.	Structural	Subjective Norm	Communication & Diffusion / Service & Infrastructure
Discontinuing industrial subsidy	Why should we subsidize the construction industry at the risk of our river?	Structural	Subjective Norm	Service & Infrastructure
Cost to municipality	It's...meeting their phase two storm water standards and don't have enough money.	Structural	Perceived Behavioral Control	Service & Infrastructure / Economic

Lack of knowledge, awareness, and understanding was one of the two largest themes areas. Specific to agricultural producers were lack of knowledge about benefits of best management practice adoption and adoption programs. Interviewees characterized producers as being unlikely to adopt measures that do not provide a benefit to their operation or unlikely to adopt measures with a small benefit if cost is incurred. Non-producer barriers in this theme were poor policy decisions from the past and untrained media reporting on water quality issues. Interviewees recounted instances where policy decisions where more difficulties were created from decisions later determined to be unwise and when media were less than precise in reporting on environmental issues.

Table 2 Barriers Theme: Lack of Knowledge, Awareness, and Understanding

Barrier	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Lack of benefits	All ... want to know how it's going to benefit them....If it doesn't have much of a benefit, they'll just keep putting it off and a lot of it's because of money issues.	Intra-personal	Attitude	Communication & Diffusion
Not knowing water source	They're kind of insulated from where their water comes from. They just think they turn on the tap and the water comes out.	Intra-personal	Subjective Norms	Communication & Diffusion
Media lacking specialize training	You put something like that on front page and you point upstream and say it's their problem, they've created it...That doesn't help the community with those relations and it doesn't clarify an issue. But journalists are not really trained to cover environmental or technical issues.	Structural / Inter-personal	Subjective Norm	Service & Infrastructure
Time to complete project	That's about their term, two to three years so they don't want to wait that long. Farmers want it done and they want it done now.	Intra-personal	Attitude / Subjective Norm	Service & Infrastructure / Collaborative Agreements / Communication & Diffusion
Not knowledgeable about causes	We did the stuff that was horrible for water quality.... It's the way it's always been done. Didn't think a thing about it. Nobody told me any different...	Intra-persona	Subjective Norms	Communication & Diffusion
Not knowledgeable about solutions	The government is not doing anything; we need to do something radical. That is juxtaposed with this sense of too much government. I'm told I have to do something, but I can't figure out what. And the people on this left end also say, somebody should do something, but they don't know what it is either.	Intra-personal	Subjective Norms / Perceived Behavioral Control	Service & Infrastructure / Communication & Diffusion /
Working through bureaucracy	So much of our state system is our own hindrance. We got permits for about everything, got to apply for permits that cost money. They don't know how to do them and then stuff requires surveys, designs, engineering, who do they go to get that done? And...I ain't going to mess with it; it's too much trouble for me.	Intra-personal	Attitude / Perceived Behavioral Control	Service & Infrastructure / Communication & Diffusion / Collaborative Agreements
Past Policy / Management decisions	"You guys ought to have your asses kicked for building a development right under a dam so close after there was a major flood. Don't expect to be bailed out again." But, stuff like that is happening constantly where we're bailing situations out that never should've been put into place. And they were put into place, with this naïve "the-government's-going-to-save-us."	Structural	Subjective Norm	Service & Infrastructure

The theme **lack of strong relationships** included such specific barriers as rural-urban polarization. Previous projects in some areas have contributed to polarization between rural and urban segments of the population. Sub-themes of exclusion rather than inclusion closely connected these barriers with misunderstandings about rural-urban encounters, past government policies over-ruling local management efforts, and limiting participation in state agency projects to producers with specific circumstances.

Table 3 Barriers Theme: Lack of Strong Relationships

Barrier	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Rural-Urban Polarization	I think the people in the city have no idea what it's like to live in the country, and the people in the country think the people in the city are very selfish.... But thinking all of this (water quality measures) is done for the betterment of (town) and the farmers know what they need and here we are trying to tell them how to work on their business.	Intra-personal	Attitude	Communication & Diffusion
Not part of the solution	There are some deep wounds ... with the rural community, but (when the government does the kinds of things that they did to the land there, there is going to be some scars in the collective consciousness of how people feel about government. You know, they took a bunch of land way, they flooded it and they usurped the work that was happening at the local level, as if what the local level--as if what they were doing was moot.	Inter-personal	Attitude	Infrastructure / Communication & Diffusion / Collaborative Agreements
Agency issues	On a county basis because they're required to focus their dollars within those TMDL areas. And you got to deal with the other partners in the whole county that want to do the same projects, but there's a little line through their county that says this guy can, this guy can't. They see the benefit of letting this guy do a couple projects too, for demos ... maybe not giving him much of a cost share, but give him a little because you want to encourage good stewardship of the water...	Inter-personal	Actual Behavioral Control	Service Infrastructure

Lack of ownership of issues was another of the largest theme areas. Taking ownership of water quality issues is difficult for producers when they are not involved in identifying solutions or when addressing a problem involves working with several agencies. Changing family circumstances may also pose barriers such as a producer close to retirement. Historical precedent was also discussed. The owner/operator of an agricultural or industrial operation that has operated in the same place using the same practices for many years may not understand the need for change or may be unwilling to bear the cost for any such change.

Table 4 Barriers Theme: Lack of Ownership of Issues

Barrier	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Not part of the solution decision	So you're kind of asking them to go above and beyond what anybody else is having to go to. And so far, I really don't think--and farmers aren't leaping at the opportunity to do more work and they really haven't been included enough, I think, in the decision making.	Intra-personal	Attitude	Communication & Diffusion / Collaborative Agreements
Time management	All the agencies get to do all this work on the clock, you know, and so it's a lot easier for them to devote time and energy. The farmers are asked to add ...it's their land, ultimately, they're going to be responsible so – and it's not part of their workday.	Intra-personal	Attitude	Communication & Diffusion
Agency issues	And so once you start throwing them (agencies) out ...I got to go through the permits and KDHE is going to be on me for that and EPA will probably jump in this. They just as soon stay back and not be in the highlight, nobody's bothering me, leave me alone so -	Inter-personal	Attitude	Communication & Diffusion
Changing family circumstances	A lot of its landowners themselves – the guy's an aging farmer out there, 40-plus. I would imagine most of the kids are going – moving to cities and getting different jobs and so we have an aging agricultural community out there.	Intra-personal	Attitude	Communication & Diffusion / Structural
Independent attitude	And then you got the next percentage down, which is, you know, by God, I'm not going to do it 'til they make me do it.	Intra-personal	Attitude	Communication & Diffusion
Inability to see the big picture	I think one of the biggest barriers is being able to relate what's at stake to folks who aren't looking at the bigger picture.	Inter-personal	Attitude / Subjective Norm	Communication & Diffusion
Too focused on profit	I think some of our agriculture and other entities are becoming such big corporations that all they look at is the bottom line. They're not looking at what is best for the state.	Intra-personal	Attitude	Communication & Diffusion / Structural
Historical precedent	Ok, I've gotten this sand (here) all these years, and now they want me to move to a pit mine, and I'm going to have to spend extra money to get that land and move my equipment and move my business...but you know, things change in everyone's life. So sometimes you just have to make accommodations for change, and a lot of people don't want to.	Intra-& Inter-personal	Attitude	Communication & Diffusion / Economic

Approaches

Seven themes emerged as approaches, three of which were not the same as those that emerged as barriers: Enforcement, place/home/community, and effectiveness of state agencies. Four approach themes were the same as the barrier themes: money, knowledge, awareness and understanding; strong relationships, and ownership of issues. .

The groups interviewed did not identify the lack of enforcement as a barrier to achieving better water quality, but they did identify **enforcement** as a valuable approach that should be used in a consistent manner. Additionally, a suggestion made in this study that was not made in the focus group study was that of mandating some practices state-wide.

Table 5 Approaches Theme: Enforcement

Approach	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Employ regulations	Those older guys are not going to mess with it unless you force them to. ... Until they tell me I have to, I'm not going to. Well, if you don't have the stick, you can't have the law.	Structural / inter-personal	Attitude / Subjective Norm	Communication & Diffusion / Command & Control
Mandate state-wide practices	Maryland just passed statewide buffers, mandatory. Now, that's a step in the right direction ... putting buffers on all streams to buffer everything coming in. There is still continuous CRP; the guy's not losing a thing. But now he's mandated. We want to try it in a few counties that are so urbanized...	Structural / inter-personal	Attitude / Subjective Norm	Communication & Diffusion / Command & Control
Consistency in enforcing existing regulations	We're the advocate that holds Kansas's feet in the fire so they will take care of the laws. I think we would try to get all the groups to work together for the common goal. I feel that is starting to happen. I'm encouraged.	Structural	Attitude / Subjective Norm	Command & Control / Collaborative Agreements

Another topic that came out of the interviews and seemed to warrant being its own theme was **effectiveness of state agencies and programs**. Although the groups interviewed all emphasized the importance of education, an approach suggested was to increase the

effectiveness of state agencies and programs. The long-time emphasis on education by state agencies without corresponding implementation with actual projects was criticized. Although education is a continuing need, the suggestion was to put education into practice and make more progress in improved water quality.

Table 6 Approaches Theme: Effectiveness of the state in addressing water issues

Approach	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
State Agencies & programs	That watershed thing has kind of been a bust. Not what we expected ... I would've said the KDHE program itself, up until just a few years ago was pretty much a bust, all that money was going out and there weren't a lot of projects going on the ground. ...But it wasn't a bust. It was funding a lot of research, a lot of educational stuff, but they'd been doing it for 20 years. I hear the EPA people saying we're tired of the research, education; let's see some results on the ground....	Structural	Subjective Norm	Service & Infrastructure / Communication & Diffusion/ Collaborative Agreements

Knowledge, awareness and understanding primarily consisted of different education approaches. Education through recreation and education programs for water professionals were each identified as valuable approaches. And, as in the previous study, emphasis was placed on having programs in the schools and the use of presentations and demonstrations. The theme **strong relationships** included working with violators of regulations to mediate the problem rather than closing them down. The watershed specialists program was identified as a viable approach for education and awareness projects.

Table 7 Theme: Increase Knowledge, Awareness & Understanding

Approach	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Education in Schools	We're working with KACEE and Stream Link and hooking kids up to the projects. We want to teach the teachers how to do it so they can go out every year and do it. We provide the project, the information, you know, the educational materials with even little water sampling kits and everything.	Inter-personal /Structural	Actual / Perceived Behavioral Control	Service & Infrastructure / Communication & Diffusion/ Collaborative Agreements
Education through Recreation	One of our tools to get that idea across to the public is through recreation. So we are actively encouraging recreation on the river. We're actively encouraging the building of public access	Inter-personal	Attitude / Subjective Norm	Communication & Diffusion
Presentation s & Demonstrations	I'm meeting groups and giving presentations to Kiwanis Clubs and to different environmental groups- 3-4 different types: stream, lake stabilization, animal waste, wetlands. We want several types of projects, demos to take people to and show them and explain what they're good for. And let the farmer tell them what the benefit to him was - usually financially - or it wasn't burden-some on him financially so that we can get that across - so they understand that it's not going to eat their pockets up to do some of this stuff.	inter-personal	Attitude / Perceived Behavioral Control	Communication & Diffusion
Education programs to professionals	We had people coming from the agencies ... We had a guy, he was road maintenance, but interested in seeing how all of this fit with what he was doing in managing that infrastructure. We had an engineer - he wanted more background on how to do green infrastructure. We had a private landowner and not only was he a private landowner, but he's also been on the National Board for Nature Conservancy, State Audubon of Kansas. And some water quality connection with Tyson...	Structural / inter-personal	Attitude/ Subjective Norm	Communication & Diffusion

Table 8 Theme: Strong Relationships

Approach	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Working with violators	We want to work with them and find out what their problems are and try and help mediate it. When we found a problem on the river we went to that company and said, “Hey, we’ve noticed this problem; we think that you need to work on it. We thought things were getting better, but then again, when we visited the site we discovered it wasn’t— So this time we went to KDHE —we don’t want to close the company down, we just want them to fix the problem.	Structural / inter-personal	Attitude/ Subjective Norm	Communication & Diffusion
Building partnerships/ cooperation	And now, I don’t know if you could probably stop them ... Topeka, Lawrence, Latham, the park, the city representatives. It’s the only time they ever get to share stuff ...You get conservation district staff and RCS people, different state agency people, plus a few of the local farmers from watershed districts that are big into cow or beef you get them involved.	Structural / inter-personal	Attitude/ Subjective Norm	Communication & Diffusion / Collaborative Agreements
Watershed Specialists	Depends where you are.... He dove right in ...probably helped us do 30 projects and probably another eight or ten. (He) has been bringing a few in now. But as far as projects coming in, you know, you can tell how active a person is by the number of projects that they’re bringing to the table.	Inter-personal	Perceived Behavioral Control	Communication & Diffusion / Collaborative Agreements

Approaches within the **ownership of issues** theme include local involvement and distribution of information by word-of-mouth. These approaches rely on local stakeholders participating in identifying issues and determining solutions, and local a producer serving as a model for a new practice.

Table 9 Approaches Theme: Ownership of Issues

Approach	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Local involvement in decision-making	The local stakeholders identify where the problems are. ...We don't use just TMDLs because that doesn't fit everybody's needs. Kansas Wildlife and Parks is focusing on biological priority areas; we cross them with TMDLs. The water office is focusing on watersheds above public water supplies. We've overlaid all those and those are our priorities.... Second priorities will be singles based on the local people. They pick their own. We're trying to get them past county boundaries; now we're getting multi-counties together doing [projects].	Inter-personal	Perceived Behavioral Control	Communication & Diffusion / Collaborative Agreements
Distribution of information through local leaders	Through the neighbors, we sit and talk. They're always wondering what you are doing? They want to know what you're up to. And they'll tell them. Well, is that a good thing? If he says it's a good thing and it didn't cost him much, by golly, that might pique his neighbor's interest, to come and say, well, Joe has one of those. Can I get one? Can I get a deal like he did? If it's a good deal, they'll do it.	Inter-personal	Perceived Behavioral Control	Collaborative Agreement

The theme, **place/home/community**, is similar to ownership but places more emphasis on concern for place. In this approach, local stakeholders take the lead in identifying issues and work for their solution to care for their home area or community.

Table 10 Approaches Theme: Place/ Home/ Community

Approach	Salient Quote	Barrier Type	Influences Model Aspect	Instrument Type
Defining issues & Solutions	If they're in the TMDL or in a priority area, we do projects there first. We're doing an EPA grant project - what that county see as issues then that's what we put in. And they use them as demo sites within that county. Doesn't matter if is has a TMDL or not, they're going to be out there trying to do good things for the county and so you got to do something to benefit them and let them feel good that they're doing great things within their county.	Inter-personal	Perceived Behavioral Control	Communication & Diffusion / Collaborative Agreements

Money as a theme included the use of money as an incentive to encourage producer participation in designated programs. Available grants often determined the type of projects the groups could sponsor; they were cited as the primary funding source behind many projects and activities.

Table 11 Approaches Theme: Money

Approach	Salient Quote	Barrier Type Addressed	Influence Model Aspect	Use Instrument Type
Landowner incentives	We got another U.S. Fish & Wildlife Service grant that focuses on landowner incentive programs, which have focused on the biological issues. So we just - we don't pay any attention, you know, we do, but we don't, you know, for the grant, we say we're going to focus on--so biological areas have the number one priority, but it just so happens they overlap the TMDLs and they get--so that's how you prioritize them. You just change the priority based on funding source.	Inter-personal	Attitude / Subjective Norm	Economic / Communication & Diffusion
Funding driven	And so grants drive what we need too. If I have a KDHE grant, we focus on TMDLs- but if I have the EPA grant, objective of that grant...is to get demo projects in every county, no matter what, want them in every county of the state.	Inter-personal	Attitude / Subjective Norm	Economic / Communication & Diffusion

Discussion

Using a qualitative method in this research allowed a broader, deeper discussion of barriers that included individual barriers as well as socio-economic and structural barriers. The interviews with representatives from these three Kansas environmental groups revealed concern about some of the larger, social structure barriers in addition to identifying individual barriers. Analyzing the interviews by type of barrier, Theory of Planned Behavior (TPB), and the Swiss model shows that intervening factors can influence behavior or intention at multiple points and that more than one type of instrument may be indicated for implementing change. These associations support Tanner's (1999) findings that education and changing attitudes is not always sufficient to change behavior. The barriers identified often were of the type and subject to influence at points of the TPB model that would indicate use of the Swiss model's "new" instruments – service and infrastructure, collaborative agreements, and communication and diffusion.

The findings of this study corroborated the findings of the previous focus group study. Themes emerging from the interviews closely aligned with themes from the earlier study with one exception. Effectiveness of state efforts was a topic raised in this study that, not surprisingly, was not raised in the focus group study. Criticism would more likely come from environmental groups than from agencies and organization that work more closely with the agricultural community. The environmental groups expressed some frustration at the number of years spent focusing on research and education without corresponding action being translated into projects on the ground. Although this may seem to be a contradiction in the findings of their support for education, it is not. This study, as much as the focus group study, stressed the importance of educational efforts to achieve the change in behavior needed and both studies

recognized the educational efforts of the watershed specialist program and its importance. The environmental group representatives weren't aware of many tangible projects initiated to address water issue problems that correspond to the research and educational campaigns the state has initiated. While continued education is needed, so are more tangible efforts.

The environmental groups questioned the appropriateness of agricultural producers being paid to adopt best management practices, something they see as a benefit to producers and a practice that producers should adopt on their own. The interviewees also questioned the appropriateness of continuing to allow industry to continue a practice for private gain at the public's expense merely because they "have always done it." The groups interviewed understand the importance of taking ownership to resolve water quality issues. That the question of who should pay for public good issues was raised is indicative of the need for a broad change in attitude across Kansas; as interviewees acknowledged that water quality is an issue that affects everyone and everyone should be involved in addressing it.

One larger social concerns identified is large farming operations, whether owned by families or industry, where profit is a greater concern than the effects operations of that scale have on the people, community, surrounding environment, and water resources state-wide. Another area of concern is that portion of the population that does not seem to "get the big picture." This barrier has been referred to as a cultural difference and as an independent, pioneering, self-sufficient attitude, and as being "stand-offish" and uncooperative. The concern is how to relate the "big picture" to this segment of the population. Solutions to these barriers are structural as well as individual and support the call for continued education, better communication of issues.

Media were seen in this study as being part of the problem, not part of the solution. Although interviewees recognized and made allowances for the fact that environmental issues are complex, often technical and difficult to understand, and that reporters are trained as generalists rather than specialists, they did cite media coverage as complicating the solution process. It is easier, more interesting, and faster for readers when reporters write a story about conflict than it is to go below the surface and investigate underlying causes and issues. Addressing this barrier will require efforts on the part of all parties involved to make information easily available to media to encourage more precise reporting on environmental issues. The interviewees did not talk about using media outlets as an approach to overcome barriers or as a resource to distribute information. This is useful for developing a strategic communication plan and identifying appropriate information channels.

Enforcement was suggested an approach although *lack* of enforcement was not identified as a barrier. As such, it held no greater emphasis than other approaches. This finding seems to support the Swiss research indicating the need to incorporate ecological, economic, and socio-cultural dimensions to promote and achieve positive environmental behavior. Like community leaders in the focus groups, the environmental groups were in favor of regulations as “the stick” to go along with the “carrot.” Equitable and consistent enforcement of regulations was also supported by respondents in both studies. Interviewees in this study did go further with enforcement, suggesting that some practices be made mandatory state-wide. They cited the example of Maryland mandating riparian buffers state-wide. The state’s water resources would benefit from the buffers and the producer would still receive compensation for keeping the land out of production.

Education was an approach of importance. These groups favored having education in schools, providing education to both rural and urban communities, and using presentations and demonstrations. The environmental groups endorse and use programs such as Stream Link, which offers training for teachers and also provides the teaching materials for them to use in their classrooms. The environmental groups also offer educational programs for water professionals; one group offers education through recreational activities for individuals and families, and one group works with violators of water regulations to mediate problems. They would rather build a relationship with the violator and work cooperatively and to solve the problem than simply have the operation shut down or fined. Other approaches suggested were one-on-one communication, local involvement, ownership, building partnerships and interagency or inter-group cooperation, and producer incentives.

Poor policy and management decisions made in the past were another barrier identified in the knowledge, awareness, and understanding theme. Responses between studies differed in their focus. The environmental group representatives stated the government shouldn't be expected to bail out communities for poor development decisions, while focus groups participants talked about the cost of remedying the problems that have surfaced from those past decisions. Data indicate that policy decisions have to include better environmental information to avoid the detrimental consequences that have occurred.

The inclusion of environmental groups to this barriers research, added another perspective while supporting knowledge gained from the focus group study and supporting theory on affecting behavior change. This information is useful on its own, but will be more useful when combine with results from research conducted with agricultural producers in high-

priority watersheds in Kansas; the best information regarding barriers and approaches producers face will come from the producers themselves.

Although addressing water quality issues arising from agriculture will go far in improving Kansas water quality, the issues the state faces are not restricted to agriculture. Similar research efforts should be made to identify barriers and approaches applicable to the rest of the population.

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