

Project Title: Home*A*Syst and Farm*A*Syst: Pollution Prevention Programs for Homeowners and Farmers

Final Report: March 2005

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Abstract

This project focused on pollution prevention around the home and by communities through stormwater education. Project outputs and total deliverables plus additional work accomplished under this grant are listed below. The grant not only met but exceeded the deliverables. This program has been highly visible and reached thousands of North Carolina residents through the multiple outreach resources used, including websites, television and radio public service announcements, and direct contact with the public.

1. Program Director (Extension Associate) will be hired for three years to provide statewide leadership for the Home*A*Syst and Farm*A*Syst pollution prevention programs.
 - A project coordinator was hired within 3 months of receiving the grant and worked full-time on this project for two years.
2. 2 Slide Sets and Training Packets will be produced to accompany existing Home*A*Syst and Farm*A*Syst fact sheets.
 - HAS/FAS/CAS website updated to provide on-line fact sheets (<http://www.soil.ncsu.edu/assist/>)
 - 2 Powerpoint cds were developed and distributed to county agents for use in conjunction with the HAS fact sheets:
 - *Drinking Water Protection for Private Well Users*
 - *Protecting Our Waters, What Citizens Can Do*
3. 6 Public Service Announcements (PSAs) for radio and television will be produced for use on local stations to educate citizens on environmental protection and stormwater management.
 - 5 English PSAs were developed: Sink/septic systems, Toilet/ septic systems, Yard waste, Hazardous Waste - fertilizer/pesticides and Pet waste
 - 2 Spanish PSAs were developed: Septic systems and Lawn care
 - The PSAs were distributed to diverse radio stations throughout the state. The stations included all types of music- country, rock, Hispanic etc. The demographic profiles that we received of the audiences indicated that by using multiple radio stations, we reached a wide audience, irrespective of age,

gender, or socioeconomic conditions. Two separate PSAs campaigns occurred during the grant. Over 4,000 PSA spots were aired during the two campaigns.

4. Stormwater Education Video (to accompany associated Home*A*Syst fact sheet) will be produced for distribution to communities throughout the state.
 - A 27 minute video, Down the Drain, How North Carolina Communities Manage Stormwater. Over 200 videos were distributed to county CES offices, League of Municipalities, municipalities, and various Councils of Government throughout North Carolina. **Many towns and cities, such as Leland, Matthews, Pitt County, Asheville, and Charlotte, use the video on their government cable access channels and use it in training sessions. In addition, it is used in college classes.**
5. Stormwater Web Site will be developed to serve as a prototype for smaller communities (such as Kinston, Havelock, Louisburg, Washington, Oxford, Smithfield) to link to (or copy).
 - The stormwater website was developed and can be found at www.bae.ncsu.edu/stormwater. The site was developed for multiple audiences, including real estate professionals, government officials, and homeowners. The site was marketed to communities and municipalities to provide a link from their own website or take and modify to suit their needs. Over **one million** hits on the website have been recorded since July 2003.
 - The following web sites provided links to the Stormwater Website: New Hanover County CES stormwater Management; City of Wilmington Stormwater; Cape Fear River Assembly; Maryland Department of Environment.
 - Caldwell County North Carolina is currently modifying the stormwater web site to meet local needs.
6. Follow-up surveys will be conducted to quantify the changes in behavior and implemented structural changes, such as new wells dug, failing septic systems replaced or community stormwater management plans developed.
 - This was the most challenging portion of the grant. A survey tool was developed and distributed through multiple sources. Users, however, were not willing to fill out the survey.
7. Additional work not indicated in the grant deliverables:
 - Pollution Prevention Training using HAS/CAS: **200** realtors, **3700** homeowners that included well screenings, **550** other groups
 - Development of sister program, Coast*A*Syst, as requested by NC Department of Environment and Natural Resources (<http://www.soil.ncsu.edu/assist/coastindex.html>). This helped meet requirements of the CZARA, Section 6217 federal program.

- Multiple presentations on Stormwater Resources were made to county extension agents, cities, towns and counties, community organizations and other state and national professional groups.

Home*A*Syst and Farm*A*Syst: Pollution Prevention Programs for Homeowners and Farmers: Report

Project/Program Objective:

As North Carolina continues to grow, demands on its water resources will increase. This is happening in large, urban areas, such as Greensboro, Raleigh, and Charlotte, as well as in smaller communities such as Rocky Mount, New Bern, and Greenville. Regulations to limit non point source pollution related to construction and urban stormwater runoff are being put into place in large and small communities.

The need to educate the public about protecting water resources is paramount. Many homeowners do not understand the link between their actions and non-point source pollution. Communities around the state are grappling with growth, new regulations, and the need to protect its water sources for the communities' well-being. The US EPA has implemented the National Pollutant Discharge Elimination System (NPDES) to regulate runoff through the Phase I and Phase II stormwater regulations.

This 319 grant was awarded to NCSU Departments of Soil Science and Biological and Agricultural Engineering to develop educational materials for communities to use to satisfy the EPA Stormwater Phase II requirements. One of the deliverables for the grant required promotion of the Home*A*Syst/ Farm*A*Syst pollution prevention program (HAS/FAS). The HAS/FAS program helps property owners identify real or potential pollution risks on the property and resolves the problems. The grant also stipulated that public service announcements, website development, and a video were to be produced to assist communities in satisfying the EPA Stormwater Phase II requirements. The Stormwater Resources Program developed under this grant fulfilled that requirement.

Home*A*Syst/Farm*A*Syst Program

The Home*A*Syst/Farm*A*Syst program (HAS/FAS) was developed to change the knowledge and behavior of rural, suburban, and urban property owners to protect the water resources. This national self-assessment program allows property owners to evaluate pollution risks and develop action plans to improve their actions to protect the environment and their families' health. Topics with this program covered:

- Protecting Water Supply
- Improving Fuel Storage
- Improving Storage and Handling of Hazardous Waste
- Improving Septic Systems
- Improving Lawn Care and Gardening
- Stormwater Management for Homeowners
- Indoor Air Quality
- Lead In and Around the Home

Target Audiences

Realtors

To reach the various audiences, presentations were developed for those audiences. One popular method was to partner with real estate continuing education classes offered through the NCSU Department of Soil Science and county Extension offices. From 2001-2003, over 200 realtors in the Triangle, along the coast, and in the western part of the state were presented with information about the HAS/FAS program to assist their clients to learn more to avoid any surprises at closing. For the HAS program, realtors' continuing education courses offered by the NCSU Soil Science Department and NC Cooperative Extension have been the best venue to introduce this program. Realtors were encouraged to complete the fact sheets with their clients to assess real or potential problems on the property. Realtors were receptive to the information and pleased to have more information available. The facts sheets on wells and septic systems were the most popular and most requested. News blurbs on HAS were also electronically mailed to realtors in Winston-Salem, Greensboro, the Asheville area, and the Wilmington area.

Well Screenings

Participants of well screenings hosted by county Extension offices around the state benefited from the HAS/FAS presentations as well. Again, the HAS/FAS information went straight to the homeowners who were delighted to learn more about their wells, septic systems, and upkeep. Through an association with the Lumber River Council of Government and county extension offices, over 3,000 homeowners received this information at well screenings held in six counties in the southeastern part of the state in 2001-2002. Surry County provided HAS packets to participants of the well screening done in Dobson in 2001. Avery and Watauga Counties held screenings in 2001, 2002, and 2004 that reached over 300 homeowners. Ashe County handed out the over 400 HAS packets to participants in the well screenings held there in 2002 and 2003. HAS packets were also made available to well drillers and well owners through the Groundwater Section of DENR.

Master Gardener Classes

Master Gardener classes were also a popular method from extending the HAS information to the homeowner. Three hundred Master Gardeners received the HAS program packets in Wake and New Hanover Counties in 2003.

Mobile Home Park Owners

In February 2003, a workshop for mobile home park owners was organized in Fletcher by the Buncombe County Extension Office for the surrounding counties. Fifty-five people were registered for the workshop and, despite inclement weather; a turnout of 30 people indicated there was a need for information on identifying pollution risks in mobile home parks. It is planned to offer this course, with an emphasis on the HAS program, every other year to reach the mobile home park owners in the mountains.

Community Groups

The HAS packets were handed out to various community groups in the state. The Wake Housing Resource Center handed out the packets at its Housing Fair held at the

Fairgrounds in March 2003. At the North Carolina Neighbors Conference in May 2003 that targeted neighborhood groups from around the state, over 200 HAS packets were handed out during the event. In 2002, through a partnership with the Conservation Fund, presentations and packets were given to homeowners in the Alligator Community in Tyrrell County to learn more about well and septic maintenance. The School of Public Health at UNC-CH held an Advanced Well workshop in June 2003 and handed out 30 of the HAS packets. The Water Systems Council also handed out HAS packets at its Wellcare Workshop in June 2003. The North Carolina Rural Community Assistance Program also has been utilizing the HAS information with the various populations it serves. Area nurseries, such as Logan's Nursery in Raleigh, also have copies of the HAS materials available to their clients along with a HAS banner to display in their stores.

Another popular audience was neighborhood associations. Through small groups such as these neighborhood groups, the information went straight to the homeowners who were generally appreciative to learn more about maintenance of septic systems or how to handle household hazardous waste. The City of Raleigh's Citizens Advisory Councils (CACs) provided successful venues to promote HAS. Based on geographical areas in the city, the volunteer CACs provide a link between the neighborhoods and the city council. The CACs also provide useful information to the citizens and HAS was a good match. About 100 homeowners received this information in neighborhood group meetings. Neighborhood newsletters were also sent blurbs about the HAS program to promote the HAS such as in Asheville.

Reaching homeowners directly was a challenge. Buncombe County Cooperative Extension provide several venues to promote the HAS information. At the five week, course, Basic Home Maintenance, homeowners use the HAS materials to learn how to prevent problems before they arise. Buncombe County Extension also provided a well and septic system workshop in May 2004 for over 20 homeowners. The HAS materials were used extensively with this workshop. Homeowners often contacted the HAS coordinator's office directly with inquiries about well water and septic system maintenance. The HAS packets were sent to the homeowner and follow up with the inquiry was made.

The HAS documents have been handed out by other faculty and agents to school groups participating in environmental studies programs, to agents in field training days, and to the general public when questions arise that HAS can answer.

Website

The Home*A*Syst/Farm*A*Syst/Coast*A*Syst fact sheets are all on line at www.soil.ncsu.edu/assist for the public to utilize. The website and the materials have been updated and corrected since 2001. In 2001, there were 759 hits on the site. In 2002, there were 3,739 hits and 468,754 hits in 2003 (Figure 1). As the charts attached demonstrate, the fact sheet on septic system maintenance has been the most popular. For the Coast*A*Syst series, the fact sheet on *Dock and Pier Construction in Coastal Communities* was the most popular. We were unable to continue tracking hits on the web site, as did not have sufficient storage space on our server to continue.

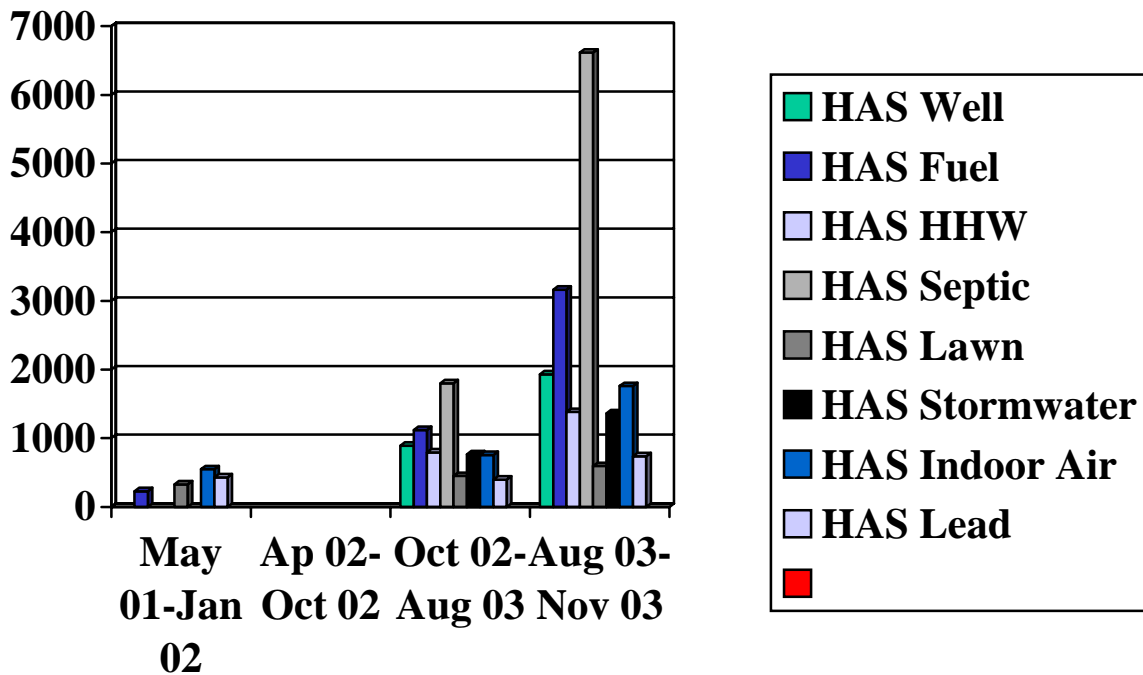


Figure 1: Number of hits on HAS factsheets.

Survey of Participants

A survey tool was developed to gauge the effectiveness of the change in behavior the homeowners made based on the information received from the HAS/FAS packets. This survey was developed in May 2002 and is attached (appendix I). The survey was handed out to neighborhood group meetings and at well screenings that was the best way to actually get the survey in the homeowners' hands. Of the 450 surveys that have been handed out, 3 were returned which did not lead to a good analysis of behavior change or modification. Such paper surveys are difficult to follow up with and to tally. There were 163 hits on the on-line survey on the HAS/FAS/CAS webpage. None were returned to the program coordinator. More money and effort to devise alternative survey methods might present a more realistic view of how the program impacted the behavior of homeowners.

Coast*A*Syst

A partnership with DENR's Division of Water Quality brought about the development of the Coast*A*Syst series. Working with Gloria Putnam and Lin Xu, the North Carolina Coast*A*Syst program was modeled after the South Carolina Coast*A*Syst program and modified to suit the needs of coastal residents of North Carolina. Topics developed were:

- Protecting Well Water in Coastal Communities
- Improving Storage and Handling of Household Hazardous Waste for Coastal Communities
- Improving Septic System Maintenance in Coastal Communities
- Improving Lawn Care and Gardening in Coastal North Carolina

- Stormwater Management for Coastal Homeowners
- Dock and Pier Construction in Coastal Communities

Response to the CAS has been favorable and the materials have been used by Master Gardener Trainings in New Hanover County.

Stormwater Resources Program

Stormwater management has become a hot topic in North Carolina. Communities around the state are realizing the impact stormwater has on water quality and are looking for solutions. The EPA has passed a stormwater rule known as Phase II to require communities with a designated population density to reduce stormwater runoff into nearby water sources. One aspect of the Phase II rule is that communities have to provide education and outreach to the public about stormwater, the impact stormwater has on water quality, and what individuals can do to reduce runoff. This 319 grant provided money to develop a stormwater website, a video, and Public Service Announcements (PSAs) for the public and municipalities to use for that purpose.

Communities and municipalities in North Carolina, such as Rocky Mount and Matthews, were targeted with the Stormwater Resources program to help them satisfy EPA Phase II stormwater requirements. Notice of the Stormwater Resources website, the 27 minute video, and the PSAs were sent to all 100 county Extension directors as well as to members of the League of Municipalities and the Association of County Commissioners. Various Councils of Governments around the state were also notified of the program and several have utilized the materials provided, especially the video. Presentations have been made to the Triangle J Council of Government in 2003. The Department of Environment and Natural Resources' Office of Environmental Education's listserv was also a valuable mechanism for promoting the Stormwater Resources throughout the state.

Website Development

The Stormwater Resources website, www.bae.ncsu.edu/stormwater, was developed to reach the real estate professionals, government officials, and homeowners. The site provided links to the EPA Phase II rules as well as explanations of what stormwater best management practices were. Continuing education courses at NCSU for realtors and engineering professionals were linked to the site. Practical advice on how homeowners could manage stormwater was also provided. The site was marketed to communities and municipalities to provide a link from their own website or take and modify to suit their needs. Over one million hits on the website have been recorded since July 2003.

Video Production

A 27 minute video, *Down the Drain, How North Carolina Communities Manage Stormwater*, was made to cover what communities around the state are doing to reduce the impact of stormwater runoff. Large, urban areas such as Greensboro and Charlotte were featured as well as communities not as urbanized, such as Alexander County. Each area illustrated a site specific BMPs that was implemented. The video demonstrated that large and small communities of North Carolina have successfully dealt with stormwater

runoff. The video also included a segment on what the individual citizen can do to reduce stormwater runoff. The video was marketed to county Extension directors, the League of Municipalities, the Association of County Commissioners, and various Councils of Government around the state. Many towns and cities, such as Leland, Matthews, Pitt County, Asheville, and Charlotte, use the video on their government cable access channels and use it in training sessions. Purdue University's Cooperative Extension is interested in using the stormwater video as a basis for their own stormwater video and is currently exploring funding sources to do so.

Public Service Announcements

A video PSA was created around the best management practice for washing a car. The video PSA has been aired on the Henderson County government access channel, the City of Raleigh's government channel, and New Hanover County's government channel. Radio PSAs were created for both English and Spanish radio listeners. Five English language PSAs were developed and covered septic system maintenance issues and lawn care issues. Two Spanish language PSAs were also produced and covered septic system maintenance and lawn care. Radio time was purchased on North Carolina News Network for statewide coverage for the English language PSAs and on La Lay radio, the only FM Spanish language radio station in North Carolina, for eastern North Carolina's Latino population. The Spanish language PSAs were also sent to radio stations around the state that had Spanish language programs. The English language PSAs were additionally sent to 230 radio stations across the state that subscribe to the Mike Walden Extension Report. Additional PSAs were created in a partnership with the City of Wilmington's Stormwater Services that were aired on radio stations that served the New Hanover, Brunswick, and Pender county areas in 2003 and 2004.

Presentations and Target Audiences

Various presentations have been created and presented for the Stormwater Resources program. The goal is to inform the general public, government officials, real estate professionals, extension agents, and other agency personnel about the program.

Cooperative Extension

The Stormwater Summit held in Wilmington November 2002 provided the opportunity to present to southeastern United States area agents the Stormwater Resources website and program. A presentation made at the Southwestern Cooperative Extension Agents District Advisory Session on Water Quality to 20 agents in Sanford February 2003 also generated interest in the resources available with this program. The NCSU Extension program, Watershed Education for Communities and Local Officials (WECO), currently uses the stormwater video in its presentations and workshops to local community members. In the fall of 2003, Wake County Cooperative Extension handed out the stormwater video in conjunction with its "Partnerships for Water Quality" program. Purdue University's Cooperative Extension also has a copy of the video and plans to utilize the video in their own production.

Cities, Towns, and Counties

Across North Carolina, communities are dealing with the EPA's stormwater management requirements and the Stormwater Resources program is helping them meet that challenge. As mentioned in the section about the video, many towns and cities are utilizing the video to educate its citizens and employees. In Pitt County, the video is used as a training tool for new employees in the Planning Department.

“The stormwater video produced by NC State University is an invaluable resource we use in educating the community on the impacts of stormwater runoff. The video addresses various types of pollutants and provides practical suggestions as how to minimize them. I recommend it for use in educating any target group”,
Dwane Jones, Pitt County Planning Department.

In Randolph County, the video has been distributed to four local municipalities who are using it as an educational tool. In Henderson County, Chris Colson, Public Affairs Officer, anticipates the video continuing to air at least two times a week over the next eight to ten months in 2004.

Community Groups

The Tar-Pamlico River Basin Planning Committee warmly received information on the stormwater program in August 2002. A presentation to the Triangle J Council of Government's Water Resources Advisory Group promoted the Stormwater Resources program to representatives from five counties in eastern North Carolina in August 2003, which produced interest in the video and PSAs. Triangle J COG has copies of the video and PSAs for its members to use. Pinecrest High School in Southern Pines is currently using the video in its Earth Science classes. Greensboro's Public Library requested a copy of the video for its clients, as did the DENR Library. School groups were also interested in the Stormwater Resources program. University of North Carolina at Greensboro's Department of Political Science also has the video for use in its Environmental Studies classes.

“I've shown the video several times in my Introduction to Environmental Studies class. The students are especially taken with the shots in the sewers, and it introduces them to an issue that isn't covered in my other course materials. It has been very useful. Thanks for sending it to me!”

Susan Buck, Director, Environmental Studies Associate Professor, Department of Political Science The University of North Carolina at Greensboro.

National Audience

A presentation on the Stormwater Resources website was made at the North American Association of Environmental Educators annual conference in Anchorage, Alaska October 9, 2003 to an international audience. Various agencies in different states expressed great interest in the program and stated the desire to use the program as a model to follow. A poster presentation on the program was also featured during Bill Hunt's presentation at the Southern Region Water Quality conference in Ruidoso, NM,

October 2003. The Stormwater: Emerging Issues for Local Communities conference in Asheville, April 2004, also spurred further interest in the Stormwater Resources program.

Other Agencies and Groups

A poster presentation on the Stormwater Resources Project was made at the Neuse River Basin: Five Years of Progress conference in New Bern, December 2003. Presentations to homeowners have been another popular method for informing the public. Gardening clubs and schools have received presentations on the Stormwater Resources program such as the Bloomsbury Garden Club in Raleigh and Douglas Elementary School in Raleigh.

Summary

The HAS/FAS program has been successful, as has the Stormwater Resources program. The HAS/FAS fact sheets and website provide practical and up-to-date information for homeowners to improve the environmental quality around their property. The most popular topics requested in the program have been on wells and septic systems. With an increasing number of people moving onto properties that have wells and septic systems, information on the care and maintenance is greatly valued.

The Stormwater Resources program has certainly resonated with communities coming to terms with stormwater and its treatment. The program was popular because it provided materials, such as the video and PSAs that many communities and municipalities could not afford to make or could not provide the time to produce. It was seen as a great tool that was provided by Extension and DENR to assist communities in dealing with runoff.

Appendix I

Evaluation Survey for Home *A* Syst Questions

Thank you for participating in the Home Assessment System (Home *A* Syst) Program. This program is designed to help you identify and reduce the risk of environmental problems in and around your home.

It is also very important for our office to be aware of the effect the program has, and how we can improve it. In order to do this, we ask that you print and then fill out this short survey after you have undergone the program and decided whether or not you will make (or have made) any changes recommended in the materials.

1. Which county do you live in? (county)_____
2. How was the program delivered to you?(please circle one letter)
 - a. Attended a group workshop sponsored by (please specify)_____
 - b. One-on-one assistance from an Extension, NRCS (SCS), or other government person
 - c. One-on-one assistance from a volunteer service person (such as an Ameri-Corp, 4-H, Master Gardener, or other volunteer service organization)
 - d. Assisted by a private consultant
 - e. Completed the program with no assistance
 - f. Other method of delivery (please specify)_____
3. Did you complete an assessment of your home? (please circle one letter)
 - a. Yes, I read most of the risk-questions in the fact sheets that apply to me and evaluated the low to high risk on my property.
 - b. Yes, I read the risk question section only and did not complete risk evaluation section in the fact sheets.
 - c. No, I did not read or complete any of the materials any of the fact sheet materials.
4. What is the source of your drinking water? (please circle one letter)
 - a. Private water well
 - b. Community or municipal water supply
 - c. Bottled water
 - d. Other (please specify)_____
5. In which group of worksheet questions did you identify a "high risk" as it relates to your property? (please circle all those that apply)
 - a. Storm-water management
 - b. Drinking water well management

- c. Home heating fuel storage
- d. Household waste water (septic systems and other treatment methods)
- e. Managing hazardous household products.
- f. Lead in and around the home
- g. Yard and garden care
- h. Indoor air quality

6. Did you dig or plan to dig a new well based on results of your screening and/or the Home*A*Syst information?

_____ Yes _____ No

7. Did you have your well tested or plan to have your well tested based on the results of the Home*A*Syst questionnaire?

_____ Yes _____ No

8. Did you have your septic tank pumped or plan to have it pumped based on the results of the Home*A*Syst questionnaire?

_____ Yes _____ No

9. Did you install water saving measures, such as faucet aerators, low flow toilets, or plan to, based on the results of the Home*A*Syst questionnaire?

_____ Yes _____ No

10. Did you plant or plan to plant more native plants in your yard based on the Home*A*Syst program?

_____ Yes _____ No

11. Did you plant or plan to plant plants to create a buffer along your yard and an existing water source based on information from the Home*A*Syst program?

_____ Yes _____ No

12. Did you redirect the gutters of your house to drain on the yard or into a rain barrel based on information from the Home*A*Syst program?

_____ Yes _____ No

Please fill out the table below regarding any recent changes you have made (or plan to make) in your home management practices or to your home to reduce the risk of environmental problems that are mainly a result of information you learned from undergoing the Home *A* Syst program. This question is very important to us, so please answer it as thoroughly as possible.

Brief Description of Change	Out-of-Pocket cost to you	Time spent on change (hrs)	Date of change

13. Do you think the Home *A* Syst program was worth doing and would you recommend it to your neighbors?(please circle one)

- Yes
- No
- Undecided

14. How could we make the Home *A* Syst program better or more useful for you or your neighbors?(please write in the space provided)

Thank you for your time and effort in completing this evaluation. Please mail the completed survey to:

Grace Lawrence
NCSU
Campus Box 7619
Raleigh, NC 27695-7619