V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Housing

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	4.2	0.0	4.8	0.0
Actual Paid Professional	13.1	0.0	1.6	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
396730	0	69241	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1619683	0	194924	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
499579	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES research in housing spans several departments and research groups, including the work of researchers in social science, community economics, design and public policy. One new project is looking at housing insecurity with the goal of providing information to designers and policy makers concerned with affordable housing. The researchers are beginning by focusing on low-income and seniors often at risk for housing issues and concentrated in rural communities. Other housing research results in 2013 included:

- ·Researchers examined the impact of high incidence of seasonal/recreational homes on the economic and demographic characteristics of small town and rural areas. They identified eight counties in Minnesota with the most recreational housing and compared home property data with assessed value of the property in the past ten years. They are also studying to what extent recreational home development impacts the planning and provision of community services such as medical facilities, police and fire protection and schools. The results have been disseminated to community development practitioners and Extension Educators.
- Design researchers have developed, tested and validated a tool to measure occupant well-being to use in planning for new construction. It includes questions around building attributes that contribute to overall occupant well-being, including thermal, acoustic, lighting, indoor air quality, privacy and personal control conditions. The instrument has been shown to have potential for use by architects, interior designers, contractors and others to measure the results of their design decisions.
- Between 2005 and 2010, one in every twenty housing units in Minnesota went into foreclosure. MAES supported social science research of the impact of that disruption to Minnesota families and communities as has been reported in previous years' Accomplishment Reports, led to changes in Minnesota foreclosure laws. Researchers are now building on that housing data and analysis to develop an understanding of the impact of foreclosure on the built environment of Minnesota, looking at three types of neighborhoods: urban, suburban and rural.
- A cross-cultural study of differences in housing needs and culturally insensitive housing is helping to develop a holistic response to cultural differences through design. The research will result in a set of principles for culturally sensitive design for architects, contractors, policy makers and planners.

Extension. Courses, consultation and research from Extension's housing technology team engage inspectors, builders, remodelers and policy makers to make homes safe and environmentally friendly. In 2013, additional consultation with national and international agencies supported policy making strategies. For example, Minnesota's Extension Housing team was invited by the EPA as the U.S. representative to the International Atomic Energy Agency to develop a Basic Safety Standard on Radon. This standard serves as the United Nation's radon risk management guidance to about 190 national radiation control programs.

The team is also engaged with the Department of Energy and the Builders' Association of the Twin Cities to create leading-edge energy performance homes and feature them during the popular Parade of Homes in the Twin Cities and Michigan. Participation in this event can bring the science of building energy-efficient homes to the general public and, thus, to consumers who can create a market for this technology.

Finally, the team was pleased to win three awards at the Department of Energy's Housing Innovations Awards in Irvine, California in 2013. Two awards were received for housing innovations that were developed through research and technology deployment. The third, which was co-presented by the National Consortium of Housing Research Centers, was presented to an Extension specialist for Excellence in Building Science Education.

2. Brief description of the target audience

The target audience for this information is builders, remodelers, contractors, mitigaters and others involved with avoiding and resolving problems in homes.

The target audience for research also includes economic developers, planners, elected officials, businesses interested in the housing stock of their communities, social science reearchers, interior designers, architects, urban designers, and planners.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1478	53340	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	3	1	4

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- Educational courses will be delivered to the target audiences.

Year	Actual
2013	53

Output #2

Output Measure

- New research will result in the development of new and revised educational materials. (Target expressed as the number of new or revised curriculum materials.)

Year	Actual
2013	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Improve the durability of new homes by working with builders. (Target expressed as the number of builders trained.)
2	Improve the availability of healthy and affordable housing through the mitigation of indoor environmental risks. (Target expressed as number of homes affected.)

Outcome #1

1. Outcome Measures

Improve the durability of new homes by working with builders. (Target expressed as the number of builders trained.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1563

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Based upon research reviewed by the National Academies, the U.S. Environmental Protection Agency estimates that radon exposure in the nation's housing causes 21,000 lung cancer deaths per year.

What has been done
The Extension Housing Program and research team trains home inspectors, contractors and builders to test occupied housing for elevated indoor radon concentrations, and to mitigate harm. The scope of training reaches from the Gulf Coast to the Canadian border and beyond.

Results
Course graduates have reduced radon in more than 60,000 homes per year and, according to an EPA matrix, prevented about 400 lung cancer deaths each year. Given the primary economic life of U.S. housing is about 75 years, the cumulative impact of the training is about 30,000 lung cancer deaths prevented.

4. Associated Knowledge Areas

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #2

1. Outcome Measures

Improve the availability of healthy and affordable housing through the mitigation of indoor environmental risks. (Target expressed as number of homes affected.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	60000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Home inspectors, contractors and builders use testing and quality standards to prevent and mitigate radon's effects in building and rehabilitation of housing. A new concern in the industry is chemical vapor introusion (CVI). CVI occurs when chemicals seep into soil and groundwater as vapors, ultimately moving into buildings to contaminate indoor air through foundations.

What has been done
In 2013, the Extension program team continued its work to measure and mitigate radon, and also collaborated with other states and the Environmental Protection Agency's CVI Science Team to develop and deliver the first CVI mitigation course.

Results
The impact of all radon measurement and mitigation courses has reached 60,000 homes. In addition, the EPA views the newly developed CVI mitigation course as the national model for CVI mitigation training. With the EPA endorsement, the course will reach inspectors, contractors and builders and will be evalauted in 2014.

4. Associated Knowledge Areas

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Public Policy changes
- Government Regulations

Brief Explanation

The work of the housing technology team is influenced by new science that identifies risks for housing safety, and by government priorities to create regulations and public information that prevents those risks. In 2013, responses to these demands furthered the mission of housing technology programs at Extension.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluation of housing programs uses models of the Environmental Protection Agency, along with known learning gains and behavior changes among home inspectors, contractors and builders who participated in measurement and mitigation courses. In 2013, learning gains of 75 percent or more and behavior changes of 75 percent or more will result in the reduction of radon in more than 60,000 homes per year. According to the EPA matrix, this will prevent about 400 lung cancer deaths each year.

Key Items of Evaluation

In 2013, learning gains of 75 percent or more and behavior changes of 75 percent or more will result in the reduction of radon in more than 60,000 homes per year. According to the EPA matrix, this will prevent about 400 lung cancer deaths each year.