

Appendix B: Mail-survey instruments (“Low Benefits” Insert)

THE ENVIRONMENTAL IMPACTS OF FARMING PRACTICES

SOIL EROSION

Soil erosion occurs when soil particles are carried away by wind and water. The current rate of soil erosion from water and wind on Minnesota cropland varies across regions. The average ranges from 4 to 8 tons per acre per year (which is 2560 to 5120 tons annually per square mile.)

EFFECTS:

- *Reduced soil fertility:* Erosion removes important parts of the soil and can reduce its fertility.

PROPOSED SOLUTIONS:

- *Encourage the planting of grasses (including pastures), trees and shrubs.*
These make the soil less likely to erode from wind and water.
- *Encourage terracing and contour farming in hilly areas.*
These methods of planting crops reduce soil erosion from water.
- *Encourage conservation tillage.*
This method of farming minimizes tilling the soil and keeps the soil covered with crop residue. It helps to reduce wind and water erosion.

EXPECTED RESULT:

- Soil scientists expect the program to cut soil erosion by 10%. Extensive scientific research has established evidence on the effectiveness of various farming practices in reducing soil erosion and overall pollution leaving the farm.

WATER QUALITY

Farming methods have effects on water quality. Rain can wash fertilizer and pesticides into streams and lakes. Bacteria (and other microorganisms) from animal manure can run off into streams and lakes. Nitrogen from fertilizer can get into groundwater.

EFFECTS:

- *Health risks*
Runoff of nitrogen from fertilizer and manure causes health risks to humans, especially infants. Bacteria (and other microorganisms) from animal waste can cause digestive and other health problems in people of all ages. These can enter the body through drinking water or through the mouth while swimming.
- *Recreation*
Water quality is important for swimming, fishing and other recreation.
- *Fish populations*
Reduced water quality reduces the variety and populations of game-fish species.

PROPOSED SOLUTIONS:

- *Encourage the planting of grasses, trees and shrubs next to streams and lakes*
These plantings, known as “filter strips”, can be effective in trapping fertilizer, pesticides and eroded soil so that they do not get into streams and lakes.
- *Encourage the conservation and restoration of selected wetlands*

Almost half of Minnesota's wetlands have been drained over the past 100 years, mainly to increase agricultural production. If wetlands are conserved and restored, they will help trap pollutants and eroded soil that reduce water quality in streams and lakes.

EXPECTED RESULT:

- The program is designed to reduce the amount of agricultural runoff to groundwater and surface water by 10%.

FLOODING

Some farming techniques have encouraged rapid draining of water from the land and into streams. These practices contribute to an increased risk of flooding.

EFFECTS:

- *Small-to-moderate flooding incidents*
These agricultural techniques that keep water from being retained on the soil increase the risk of small or medium sized floods (floods that occur on average every 2 to 10 years.) Extreme flood events (that occur on average every 50 to 100 years) would probably occur with any agricultural system.

PROPOSED SOLUTIONS:

- *Encourage the conservation and restoration of selected wetlands*
If wetlands are conserved and restored, they will help to retain water. This will reduce the risk of flooding.
- *Encourage farming practices which increase the amount of plant matter on or in the soil*
This increases the ability of the soil to absorb and retain water.

EXPECTED RESULT:

- The program is designed to reduce the amount of small to moderate sized flooding from agricultural land by 10%. Scientists do not expect this to impact the most severe flood events.

BIRDS AND WILDLIFE

Land that is planted entirely in row crops does not provide good habitat for most birds and wildlife.

EFFECTS:

- *Reduced bird populations and bird variety*
More diverse landscapes, including grassland, wooded fence rows, wetlands, and a diverse mixture of crop plantings allow birds to nest and migrate more successfully. Scientists have found that species of both game and non-game birds can be 5 times as high on diverse landscapes, as compared to land in row crops.

Please look at the figure on the back of this sheet. The figure is adapted from an article "Breeding Bird's Habitat" in *The American Midland Naturalist* by L.B. Best, K.E. Freemark, J.L. Dinsmore and M. Camp, July 1995 Vol. 134, pages 1-29.

The figure below illustrates 4 types of agricultural landscapes. Each square represents a plot of land that is $\frac{1}{4}$ of a square mile (160 acres). The four types of land uses shown vary in the

application of these conservation practices. The degree of habitat diversity increases from left to right. The most diverse landscape (shown at far-right) supports up to 5 times more bird species than land planted entirely with row crops.

figure

PROPOSED SOLUTIONS:

- *Encourage increases in the diversity of the landscape*
This would include wooded fence rows, grassy areas along waterways, conservation and restoration of selected wetlands. It would also include planting a diverse mixture of crops, instead of land that is entirely tilled for row crops.

EXPECTED RESULT:

- Scientists expect that the available bird and wildlife habitat on Minnesota farmland will increase by 10% as a result of the program.

GREENHOUSE GASES (CARBON DIOXIDE AND NITROUS OXIDE)

Agriculture can result in the release of greenhouse gases. Greenhouse gases contribute to the greenhouse effect, caused by the insulating effect of carbon dioxide, nitrous oxide and other gases that retain heat near the earth's surface. Scientists refer to the idea that increases in these gases may cause changes in weather patterns and higher average temperatures as "climate change" and "global warming."

Carbon dioxide: Conversion of land from native vegetation to cropland exposes carbon in the soil, and results in the release of carbon dioxide. The draining of wetlands for agricultural production also releases carbon dioxide.

Nitrous oxide: Nitrogen is a necessary nutrient for crops, and must be replenished in the soil through the use of organic or synthetic fertilizers. Nitrogen compounds in the soil can be chemically converted into nitrous oxide. Approximately 70% of the nitrous oxide released by human activity comes from agriculture.

EFFECTS:

- *Possible global climate change*
Climate change and global warming may have very unpredictable effects. It may result in more extreme weather events, or diminished productivity in some agricultural regions.

PROPOSED SOLUTIONS:

- *Encourage the conservation and restoration of selected wetlands*

- If wetlands are conserved and restored, they will help to retain carbon dioxide.
- *Encourage conservation tillage*
This will help retain more carbon in the soil.
 - *Reduce the use of nitrogen fertilizer on cropland.*
This will reduce the release of nitrous oxide.
 - *Encourage the conversion of cropland into woodlands, grasslands, and pasture lands*
These uses of the land will help retain carbon in the soil and will reduce the release of nitrous oxide.

EXPECTED RESULT:

- The program is designed to reduce the release of greenhouse gases from agriculture by 5 to 10%.

COSTS OF THE PROGRAM AND COSTS TO YOUR HOUSEHOLD

Currently estimates are being generated on how much this program would cost the typical Minnesota household. While economists can estimate the cost to the typical household, the costs to specific households will vary based on:

- the household's tax bracket and
- the household's spending pattern on some foods.

Funding the program could cause higher taxes or lower rebates.

If this program were implemented, the state would have to fund it by either spending less money on other programs (such as those mentioned at the start of this survey) or by increasing taxes or decreasing rebates.

Prices of some foods would increase.

This program would encourage conservation practices more than current policy and would likely result in a slight increase in the prices of some foods. Price increases would result from factors such as increases in the costs of production, lower production or the idling of some lands. The level of price increases would depend on differences in markets for various foods. Costs would be lower for households that purchase fewer of those foods that have the highest price increases.

The cost estimate has been calculated as a fixed annual payment over many years (at least a decade), similar to a fixed annual mortgage payment.

If this proposal passes, your household will have less money to spend on other things for at least the next ten years due to higher prices for some products, higher taxes or lower rebates.

Because costs will vary across households, we are asking different households about different costs within the expected range of costs. Please answer the questions carefully even if you view the cost stated in Q-13 as very high or very low. It is important that you tell us whether you would vote "For" or "Against" this proposal based on whether you view the environmental effects of the policy to be worth the stated cost to your household. Please consider how you would vote based on your current level of household income.

Next please return to the survey booklet to answer how you would vote in Q-13.