LOGIC MODEL

Name of Program: Natural Resources

Situation: Natural resources provide ecological services and products that society depends upon. As humans continue to use the products (water, trees, plants, animals, soils, minerals, etc.) and services (pollination, nutrient cycles, decomposition, etc.) from ecosystems, integrative decision making and natural resource management plans are necessary to: 1) sustain resources for food, fiber, fuel and drinking water, 2) promote economic growth, 3) create recreation opportunities, 4) improve forest health, 5) provide wildlife habitat, and 6) conserving open space and wildlands.

Goal: To foster integrative decision making and natural resource management plans to: 1) sustain resources for food, fiber, fuel and drinking water, 2) promote economic growth, 3) create recreation opportunities, 4) improve health of forests and other ecosystems, 5) provide wildlife habitat, and 6) conserve open space and wildlands.

INPUTS What we invest	OUTPUTS Activities What we do	OUTPUTS Participation Who is reached	Short: What do we think participants will know, feel, or be able to do after participating in the program?	Medium: How do we think the participants will behave or act differently after participating in the program?	Long: What kind of impact can result if the participants behave or act differently after participating in the program?
• Specialists & educators with expertise in social science, public engagement, curriculum development, adult learning, ecology, agronomy, water, soils, forestry, farm business, engineering, pest management, wildlife management, and community & rural development. • Local connection through extension educators with landowners, farmers, and community leaders • Curriculum and other educational products • Purdue Ag Centers and other properties • Graduate and undergraduate students • Partnerships: ○ Commodity and industry associations	**Program Development** • Professional development • Develop tools & management practices specific to a system (ag, woods, urban, etc.) • Develop decision-making processes for natural resources based business **Program Delivery** • Awareness - mass media , newsletters, social media application • Access to expertise - Web resources, eXtension, one-on-one consultation by educators and specialists, extension publications.	**Those Implementing Change** • Private landowners • Hardwood industry • Agriculture professionals • Natural resource professionals • Green industry and landscape managers • Urban/suburban businesses, including consultants • Agricultural producers (row crop and livestock) • Aquaculture farmers • Homeowners • Public land managers • Professionals / stakeholders representing water, energy, climate, wildlife, education, and soils • Recreation professionals / stakeholders –	**Knowledge Gain:** • Ecosystem services & functions literacy in terms of products, regulating services, cultural services, and social services INDICATOR = # of participants gain knowledge about ecosystem services… (FNR core #1) • Different management options when restoring, conserving, and over-using ecological resources INDICATORS = # of participants gain knowledge about different management options…(FNR core #1) NIFA GF2.7. # of first detectors trained in early detection & rapid response of plant pests, animal pests and diseases (e.g. invasive plant species) • Sustainable energy, woody biomass and biofuels strategies, techniques, technologies and management INDICATOR = # of participants gain knowledge about sustainable energy… • NIFA SE#4. Increased knowledge and understanding of the biofuels supply chain. INDICATORS = NIFA SE4.1. # of new technologies developed. NIFA SE4.3.a. # of participants increased knowledge on production / harvesting / storage systems NIFA SE4.4. # of new production / logistic practices developed	**Behavior Change:** • Greater use of ecosystem service valuation by decision makers INDICATORS = # of plans created or revised. # of participants adopt use of decision-support tool • Management plans account for the financial and ecological value of the "free" services provided by ecosystems INDICATOR = # of plans created • Participants / stakeholders adopt best practice management for biofuels supply chain INDICATOR = NIFA SE4.3.b. # of participants / stakeholders adopted best management practices for production / harvesting / storage systems. • Decision makers take into account impacts to ecosystem services when evaluating policies and taking action INDICATORS = NIFA GF2.11 # of acres incorporate ecosystem services and/or biodiversity considerations NIFA CC2.1 # of participants employ climate adaptation strategies in natural ecosystems, including strategies for biodiversity	**Environmental:** • Ecosystem services are conserved or enhanced while maintaining use of ecosystem resources INDICATORS = NIFA CC3.1. # of participants adopted recommended climate mitigation practices (e.g., water use efficiency, carbon sequestration, reducing carbon and energy footprint) NIFA CC3.2. # of acres under recommended climate mitigation practices (e.g., water use efficiency, carbon sequestration) # of acres employing best management practices NIFA GF2.12. % of privately owned agricultural acreage retained during landowner succession due to educational interventions. Refers to working lands, nonworking lands, and other landscape components, like rangeland, forestland, cropland, conversation lands, wetlands, water bodies, riparian areas, etc. • NIFA SE#6. Develop a diverse and educated workforce for a biofuels industry INDICATORS = NIFA SE6.2. # of graduate students working in biofuels labs NIFA SE6.3. # of biofuels workers trained **Economic:**

○ USDA NIFA, NRCS, & FS ○ Local, state, & federal government ○ Local & state agricultural and environmental regulatory agencies ○ Private sector conservation, environmental, and other organizations • Other Capacity (formula) and competitive funding; state funds; program revenue	• Introductory education - field days, local and regional workshops, grower focused events • Advanced education - educational experiences through conferences and curriculum based trainings, demonstration, and professional development of faculty and advisors.	agritourism, outfitters, etc. • Local government staff • Environmental / conservation educators • Public and private utilities **Those Advising Change** • Public agency staff • Local decision makers • Advisors of natural resources information **Those Developing and Implementing Public Policy:** • Local, state, & federal agency personnel (NRCS, SWCD, DoA, etc.) • Communities and community leaders • Local, regional and state boards and commissions • Elected officials (federal, state, local, county township) **Tomorrow's Leaders** • Youth • Undergraduate students • Graduate students	**Skills Development:** • More people have skills to assess ecosystem health and sustainability to monitor ecosystem services, and to communicate results INDICATORS = # participants aware of how to assess ecosystem health… # participants who intend to adopt ecosystem practices… (FNR core #2) • Increase ability for collaborative management approaches to ecosystem conservation and restoration INDICATOR = # partnerships / agencies working on programs or management strategies • More people have ability to evaluate the effects of actions and decisions on ecosystem health and sustainability INDICATOR = # participants who indicate they can apply a decision-support tool to make decisions and take actions on ecosystem health and sustainability • NIFA SE#5. Integration and evaluation of sustainable biofuels and bioproducts systems NIFA SE5.1. # of decision tools available NIFA SE5.5. # of producers gained knowledge of decision models NIFA SE5.6. # of policy makers gained knowledge of decision models • NIFA CC1. Development of new knowledge and new technologies in agricultural and forestry science and the transfer of these to clientele to address the effects of climate variability and change INDICATORS = NIFA CC1.6. # of new assessment and management tools developed, including models and measurements of greenhouse gas emissions NIFA CC1.7. # of climate relevant social media products, web-based products and communication tools (smart phone apps, Facebook, Twitter)	NIFA CC2.2 # of acres under recommended adaptation strategies for natural resources management • Communities adopt best management practices, in public or private lands, for the maintenance of locally-valued ecosystem services INDICATORS = # of landowners / agencies adopt best management practices for maintenance of locally-valued ecosystem services NIFA CC2.3. # of participants adopt recommended adaptation strategies for production agriculture and natural resources management, including invasive species, pest management, pollutant loads, wetlands NIFA CC2.7 # of agencies / organizations / communities incorporate climate-based management practices in community development	• Ecosystem services contribute to the economic well-being and growth of communities INDICATORS = # visitors to local open spaces, parks, etc. Property values increase adjacent to parks / open spaces Local/county investment in management and conservation of natural resources • Business and industry dependent on natural resources remain economically viable INDICATOR = # of businesses (eco-tourism/recreation/forestry) **Civic:** • Policies and guidelines that reflect the conservation and management of ecological resources for future generations INDICATORS = # of policies and guidelines NIFA CC3.3 # agencies / organizations / communities that adopted recommended climate mitigation practices and policies (e.g., applied water conservation policies)

			NIFA CC1.8. # of new climate relevant databases, monitoring systems, and inventories managed or under development NIFA CC1.9. # of participants that increase knowledge of management practices under climate variability and change		

ASSUMPTIONS
1) Land and water use decisions and human population growth increase consumption of products provided by ecosystems
2) The assumption that the services are “free”, and the complexity of integrating the four categories are all factors that create challenges to sustain ecosystem services in the future.
3) An increase in knowledge and skills will lead to behavior change
EXTERNAL FACTORS
1) Increase demand for food production to meet global needs.
2) Increase demand for water resources for food production, industry, and energy resources.
3) Introduction of exotic pests and pathogens.

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