Implementation of Plans of Work (POW) under the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA)

TABLE OF CONTENTS

Characterization of Invasive Species in

I. INTRODUCTION

Land-Grant Mission & Goals

The mission of the Department of Land-Grant Programs is to aid in the academic, technological, economic, and social advancement of the State of West Virginia by identifying resources and programs pertinent to the progression and dissemination of knowledge and services by way of research, teaching and extension.

The specific goals of the Department of Land-Grant Programs are to:

1. assist various organizations and the College by circulating grant information, as well as by identifying and obtaining funds necessary for the development and maintenance of land-grant programs;

2. coordinate the further expansion of extension and applied research programs, internal and external to the College;

3. work collaboratively with West Virginia University Extension and Agriculture and Natural Resource Development Center to build stronger and broader outreach programs in the areas of youth, family, workforce, community and economic development, and cooperative research;

4. promote and support the development of cutting-edge applied research and extension projects that are in-line with current state and national land-grant initiatives;

5. continue building partnerships with existing extension and research groups, businesses, institutions, as well as, local, state and federal agencies; and

6. aid institutions of secondary and higher education in workforce preparation by increasing baccalaureate, post-baccalaureate, certificate, and employment opportunities for students in all academic disciplines.

Current Developments

Since West Virginia State College has not functioned as a land-grant institution for nearly 50 years, fiscal year 2000 was a capacity building one for the College, and more specifically, the Department of Land-Grant Programs. There are a number of areas and positions that were reintroduced including the Offices of Cooperative Research and Technology Development, the Office of Cooperative Extension, and the Office of Community and Economic Development. As a result, the reinstatement of land-grant status is positively influencing the College's educational agenda, as it moves from a resident instruction institution to one with the additional functions of cooperative extension and cooperative research.

In keeping with the USDA workforce preparation initiative, the partnering of WVSC-Community and Technical College with the Department of the Land-Grant Programs appears to be a strategically important match. Furthermore, the establishment of a graduate education college would be in the best interest of all as the Department of Land-Grant Programs begins to identify research faculty and programs responsive to state and federal needs. As the college moves to a campus inclusive of resident instruction, research, and extension, the likelihood of WVSC becoming West Virginia State University is a probable outcome.

Resources

The current USDA fiscal support of $1M for research and $1M for extension, functions as seed funds to establish cooperative research and cooperative extension infrastructure and program efforts for FY 2000-2001. These funds support all of the current cooperative research and extension programs including operating costs, fixed costs, administrative, paraprofessional and clerical personnel in charge of developing, implementing, and maintaining programs. More specifically, the extension areas of workforce, family, youth and community development in specific target areas for program delivery are essential. Research dollars go to jump-start applied research programs primarily in the Departments of Biology and Chemistry at the College until programs in other departments are developed. These funds are contributing to the establishment of the agricultural programs within the College. Finally, important synergies between the College and the Department of Land-Grant Programs are assisting the College in making the land-grant mission an integral part of all academic departments within the institution.

Stakeholder Input

Stakeholder input is critical to the success of all efforts in 1890 related Cooperative Research and Cooperative Extension Offices. The acquisition of the input is a vital function of the nature of the research and extension programs. Program development and implementation effectiveness derived from stakeholders representing diverse backgrounds including research advisory committees, community groups, legislative committees, industrial affiliate and target audiences are of extreme importance. Equally important are the means by which inputs are obtained. These include the conducting of meetings, forums, and focus groups discussions.

Merit and Scientific Review

The merit and scientific review process is essential to continuous improvement of the programs that enhance the quality of life for people. This review process should be one that insures that all of the research projects proposed are scientifically sound, relevant to society's agricultural, environmental and food needs, and be in agreement with the USDA national initiatives. In addition, it needs to reassure the project proposal completeness, evaluate its relevance, as well as, its quality and scientific value. In a similar fashion, the merit review process for current extension programs must consider the need, the quality and the feasibility of implementation of the programs. Furthermore, the opportunities for cooperation with other individuals or units for each of the projects should be considered. In both instances, the review process is designed so that project leaders can interact with reviewers, and also to provide a mechanism to assess program effectiveness and accountability for each of the projects. The review process used by the WVSC Department of Land-Grant Programs insures the above criteria for both research and extension areas. Extension and research advisory boards, made up of community leaders, scientists, faculty, and main stakeholders of each program, will conduct annual performance evaluations. Additionally, all new or revised research and extension proposals are thoroughly reviewed on a periodic basis by officials of the Department of Planning and Advancement for quality evaluation and implementation feasibility purposes.

Faculty Appointment System

The Department of Land-Grant Programs at West Virginia Sate College is currently working with Academic Affairs in the design of an appointment system for those academic faculty members who will be involved in land-grant research programs. This appointment mechanism is similar to the ones already in place at other land-grant institutions. The Department of Land-Grant Programs will purchase a percentage of the faculty members time, which will be devoted to land-grant related activities.

II.IMPLEMENTATION OF PLANS OF WORK

A. Cooperative Research and Technology Development Programs

GOAL 1. ***An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.***

Research Program 1.1 "Crop/Plant Growth Modification and Development"

Statement of Issues

The regulatory mechanisms that control the metabolism of cytokinins (a major plant growth regulator) affect all phases of plant development and conditioning. In addition, these mechanisms affect many of the physiological responses of plants to their environment. The nature of these regulatory mechanisms remains one of the major unresolved problems in plant hormone physiology. Understanding these mechanisms is essential for the identification of novel biochemical targets that modify crop/plant growth and development, and is vital for scientists working to recover genetically altered plants via plant regeneration and somatic embryogenesis. Of great interest are the legumes, which are among the most difficult transformants to recover *in vitro*.

Performance Goal

1. Characterize the enzymes, genes and their regulation of cytokinin metabolism in food legumes
2. Determine the role of various cytokinins at various stages of plant growth development

Output Indicators

Results of the proposed research will contribute new information concerning the regulation of cytokinins

Development of tools important to future investigations of the molecular regulation of cytokinins in plant tissues including the role of cytokinin metabolic enzymes in regulating the plant cell cycle

Number of internal and external presentations

Number of journal publications

Outcome Indicators

New programs involving the genetic and chemical manipulation of cytokinin metabolism that enhance yield and improve growth characteristics of crop plants

Development of strategies for the efficient regeneration, organogenesis, and embryogenesis of plants from cells of food legumes and other plants that have been difficult to manipulate in tissue culture

Key Program Components

1. Study the regulatory mechanisms controlling the synthesis and activity of cytokinin oxidase (the enzyme that specifically catalyzes the degradation of naturally occurring cytokinins) in callus cultures and whole plant materials derived from selected genotypes of Phaseolus species
2. Investigate the regulatory mechanisms controlling the synthesis and activity of cytokinin synthase (the enzyme that catalyzes the key step in cytokinin biosynthesis) in callus cultures and whole plant materials derived from selected genotypes of Phaseolus species

Internal and external linkages

1. WVSC researchers and extension specialists/agents
2. State and federal laboratories and other universities
3. Domestic and international businesses
4. WV plant materials laboratories

Target Audiences

1. Biotechnologists that utilize cell and tissue culture for the genetic manipulation of crop plants
2. Agronomists and horticulturists that develop cropping strategies, which utilize plant growth regulators to facilitate production. Special attention will be devoted to legume crops, which include soybeans, beans, peas, alfalfa, clovers and related crops

Program duration

This program will continue for the four-year life of this plan.

Allocated Resources — $337,996

Research Program 1.2 "Rapid Crop and Soil Assessment Studies"

Statement of Issues

Maximizing productivity in agriculture requires the maintenance of many environmental parameters within narrow ranges. In American agriculture this is primarily achieved through the application of chemical agents. If inadequate amounts of fertilizer or pesticide/fungicide are applied, crops may fail to thrive or succumb to pathogenic organisms, but if excess amounts are applied, money is wasted and the excess chemicals become an environmental problem. Plants contain numerous chromophores that change how they absorb and reflect light in response to chemical conditions such as pH levels and the presence or absence of minerals. These chromophores go unnoticed because chlorophyll strongly reflects light at wavelengths near the maximum sensitivity of the human eye. By the time a leaf becomes noticeably less green irreversible damage has often occurred. Important agricultural chemicals including nitrates, phosphates, pesticides and fungicides are colorless to the human eye. Thus, their presence or absence cannot be determined by sight. A "spectroscopic diagnostic system" that can detect specific changes in plant health and soil chemistry and prescribe a measured response to restore the balance would be a valuable tool in support of sustainable agricultural practices.

Performance Goals

1. Perform experiments on soil and plant samples over a wide range of nutrient, toxin and pH levels
2. Create an expert system capable of correlating the intensity of scattered visible and invisible light to specific environmental parameters
3. Make this technology available to farmers and foresters in West Virginia via educational outreach and demonstrations

Output Indicators

1. Develop reflectance and Raman scattering methodologies for the collection of data on plants and soils from greenhouse controls and field samples
2. Create relational databases and statistical data analysis algorithms to identify strong correlations between optical spectra and soil chemistry or the presence of plant pathogens
3. Assemble and test prototype portable units composed of laptop computers and handheld spectrometers suitable for on the spot real time assessments in the field
4. Number of internal and external presentations
5. Number of journal publications

Outcome Indicators

1. Detect plant stress in its early stages before it is visible to the naked eye and before irreversible damage has occurred
2. Correlate the observed plant stress to its root cause so agricultural stakeholders can plan effective targeted responses
3. Prevent unnecessary expense and environmental damage from broadband application of chemical agents to revive unhealthy plants

Key Program Components

1. Create a set of control samples using a greenhouse and a small outdoor test garden
2. Develop repeatable, reliable experimental protocols for measuring reflected and scattered light from soil and plant samples
3. Perform statistical analyses of the multivariate data sets to obtain the variables of maximum modeling and discriminatory power with respect to the environmental parameters under investigation
4. Enlist the cooperation of a small number of farms and forests to be part of early field tests.
5. Incorporate as much of the technology as is practical into the design of the portable systems
6. Engage in educational and demonstration activities to promote the technology and collect feedback from stakeholders

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. Farmers and foresters
3. WVU Agriculture and Natural Resources

Target Audiences

1. WV farmers
2. WV foresters
3. WV nurserymen
4. State and federal environmental agencies

Program Duration

This program will continue for the four-year life of this plan.

Allocated Resources — $433,000

GOAL 2. ***A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education.***

Research Program 2.1 "Development of Anti-fungal Agents"

Statement of Issues

Citizens of West Virginia and the United States are concerned for a plentiful supply of safe foods and other products, available at low cost. Pyoluteorin is a known anti-fungal agent that is effective against pathogens of cotton, among other crops. A reasonable synthesis of this material will allow extensive testing at the Horticulture Crops Research Laboratory of the Agriculture Research Service of USDA in Corvallis, Oregon, to see what other crops are protected by this material. This research then will be applied to the preparation of various analogs of pyoluteorin in the hope of developing even more active antibiotics.

Performance Goals

1. Improve crop production and yield
2. Increase food supplies and lower costs

Output Indicators

1. Improve seed survival rate via the addition of additives
2. Higher crop yields resulting from healthier plants
3. Number of internal and external presentations
4. Number of journal publications

Outcome Indicators

1. Increased supply of targeted foods and staples
2. Lower costs products
3. New, potent anti-fungal agents

Key Program Components

1. Preparation of pyoluteorin in quantities sufficient to

conduct extensive testing to see what pathogens this novel anti-fungal agent can destroy
2. Synthesis of analogs in an attempt to find higher activity as well as a broader spectrum of activity

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. USDA Agricultural Research Service (Corvallis, OR)
3. WV Department of Agriculture
4. Other Colleges and Universities

Targeted Audiences

1. WV consumers and the nation
2. Global agriculture community
3. American Society for Horticulture Science (ASHS)
4. Relevant industrial entities

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $102,102

Research Program 2.2 "Microbe Reduction and Bioprobe Detection"

Statement of Issues

Many sources of food-processing waters can be potentially contaminated with food spoilage microbes. These microbes can affect the final product that is sold on the open market. Contaminants in the final product can go undetected due to lack of rapid specific and sensitive microbial detection and characterization. Once the microbes can be detected and characterized, the microbial contamination in food production can possibly be controlled. In the food production industry, the control of microbial contamination in food processing is sometimes inadequate. Thus, proper training is required to minimize contamination.

Performance Goals

1. Reduce the presence of microbes in food process waters
2. Detection of bacteria in food raw materials and final product, with a view to increase hygiene using critical control path analysis

Output Indicators

1. Develop methodologies to reduce presence of microbes in process waters using physicochemical means and using bioluminescence for detection of microbial removal
2. Using polyclonal and monoclonal antibodies for the detection of coliforms and *Pseudomonas sp*. of special interest to food production, develop a presumptive and final confirmatory test procedure will ensure raw material and final product microbial safety
3. Providing training in detection methodologies, (hazard analysis critical control paths, [HACCP]), for detecting microbes of particular interest in food production
4. Number of internal and external presentations
5. Number of journal publications

Outcome Indicators

Reduced presence of microbes in food production process waters

More sensitive and specific detection of microbes in raw materials and food final products to increase food safety and hygienic production of food

Increased awareness of food safety regulations and implementation in food production areas

Key Program Components

1. Development of optimal physicochemical methodology for reducing the viability of microbes using cavitation
2. Development of the optimal conditions as well as concentrations of primary and secondary antibodies for maximum sensitivity detection. Use of pre-incubation steps for increasing sensitivities will also be compared with need for speed of detection
3. Training sessions with food producers on HACCP will ensure increased awareness of the need for hygienic food production

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. State and federal laboratories
3. End-users of newly developed technologies
4. Domestic and international institutions
5. Exeter University (UK)
6. WV Department of Agriculture

Target Audiences

1. Food producing companies as well as those involved in food testing with the development of specific test kits
2. Dairy and beverage industries
3. Testing houses

Program duration

The program will continue for the four-year life of this plan.

Allocated resources — $275,000.

GOAL 3. ***A healthy, well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices.***

Research Program 3.1 "Protein Replacement for Aquaculture Diets"

Statement of Issues

Major constraints hindering the development of U.S. aquaculture include the feed and production costs and the amount of waste generated and released into the environment. Since protein is the most expensive component of the aquaculture diet, fish nutritionists have considered the partial substitution and total replacement of the costly protein with those that are less expensive. Inexpensive plant-protein and alternative sources of animal-protein are being considered. The recovery of proteins from treated poultry and municipal wastes may be the next viable option for the replacement of more expensive animal-protein. The treated poultry waste is a low-pollution feed and it will significantly reduce the amounts of pollutants released to the environment.

Performance goals

1. Provide information on the utilization of alternative sources of proteins from poultry and municipal wastes
2. Identify methods available for the development of low-pollution fish feed to manufacturers

Output Indicators

1. Method for waste utilization that protects the environment
2. Replacement (partial or total) of very expensive protein sources in fish feeds with less expensive alternative from poultry and municipal wastes
3. Development of low-pollution fish feeds
4. Number of internal and external presentations
5. Number of journal publications

Outcome Indicators

1. Reduced feed costs from usage of cheap alternative protein sources
2. More rational use of dietary supplemental phosphorus in feeds in relation to life history stages of rainbow trout culture
3. Reduced water pollution from aquaculture operations

Key Program Components

1. Determination of the feasibility of utilizing recovered proteins from treated poultry and/or municipal wastes as dietary supplement for rainbow trout and channel catfish
2. Determination of the apparent digestibility of amino acids and phosphorus in formulated diets containing different levels of recovered proteins
3. Establishment of acceptable and optimum dietary levels of recovered proteins from treated poultry and/or municipal wastes for rainbow trout and channel catfish
4. Determination of dietary phosphorus requirements of rainbow trout in relation to life history stages
5. Increment of the bioavailability of phosphorus in feeds based on recovered protein in rainbow trout and channel catfish
6. Determination of the effects of feeding practices on waste load in rainbow trout and Atlantic salmon culture systems
7. Development and recommendation of low polluting diet formulations for channel catfish and rainbow trout culture
8. Evaluation of the effects of recovered proteins on the health and immune responses of rainbow trout and channel catfish
9. Screening for pathogens in channel catfish and rainbow trout fed diets containing recovered proteins from poultry and/or municipal wastes

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. USDA Agricultural Research Service
3. Business community
4. WV Department of Agriculture

Target Audiences

1. Poultry and /or municipal waste generators in West Virginia
2. World, national and state aquaculture industry

3. Rainbow trout and channel catfish farmers

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $452,972

GOAL 4. ***Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture and forestry's complex links with soil, water, air, and biotic resources.***

Research Program 4.1 "Detection of Environmental Toxins in Soil and Groundwater Supplies"

Statement of Issues

Copper is a naturally occurring element in the environment. Copper is also an essential microelement for many plants and animals at low concentrations. At high levels, however, copper can be toxic to most species, and it can contaminate soil and groundwater supplies. Elevated concentrations of copper in the environment have been attributed to agricultural practices, industrial activities, wastewater treatment plants, and mining practices. Currently, the determination of copper at contaminated sites is conducted via Atomic Absorption spectrometry. Development of non-invasive, non-toxic, environmentally safe, and reliable "on site" methods that are cost-effective for the detection of copper in the environment would be advantageous to researchers and stakeholders.

Performance goals

1. Increase technological methods used to determine the levels of heavy metals such as copper in contaminated soils and the environment
2. Develop reliable "on site" detection of copper contaminants

Output Indicators

1. Method for cost-effective alternative determination of copper levels in soil and groundwater
2. Determination of copper contamination site boundaries at a faster rate for

remediation
3. Determination of the associations that copper exhibits with soil and its organic matter components
4. Number of internal and external presentations
5. Number of journal publications

Outcome Indicators

1. Facile determination of contaminated copper sites for remediation
2. Reduced cost of the determination of elevated copper levels "on site" in ground waters and reservoirs
3. Development of cost-effective "on site" methodology for other heavy metal detection in contaminated soils

Key Program Components

1. Development of new methodology detecting the levels of copper in soil as compared to standard protocol (Atomic Absorption)
2. Determination of the feasibility of the new methodology in detecting the levels of copper in soil
3. Isolation and characterization of the soil samples and humins sampled from various soils known to be contaminated with copper such as mine sites and sewage sludge areas
4. Determination of copper levels in contaminated sites by new methodology and standard protocol (AA)
5. Determination of copper levels in various components of soil, humic acid, fulvic acid, and humin
6. Evaluation of feasibility, reliability, cost-effectiveness, and portability of new methodology for the detection of copper levels in the environment
7. Evaluation of the interactions of the sorption, fate, and transport of copper in soil, sediments, humic materials, and ground waters

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. State and federal laboratories
3. Business Community
4. WV University

Target Audiences

1. Concerned parties about sites including abandoned mine sites, sewage sludge areas, and known sites of copper contamination in West Virginia
2. Global scientific and business community engaged development of "on site" detection of other heavy metals in the environment

3. Chemical and environmental communities

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resource — $210,000

Research Program 4.2 "Soil Remediation Studies"

Statement of Issues

Determining and understanding the fate and transport of anthropogenic organic compounds and contaminants (either intentionally or unintentionally applied) in soil and humic materials is an ongoing research project. All erudition is fundamental to the balancing act of providing harmony between agriculture and the environment. Soil and soil organic matter are essential to the future of agriculture.

The organic matter of soil, humus, is an important constituent contributing to increased sorption of organic contaminants. Humus or humic materials can be operationally defined by three distinct fractions: humic acid, fulvic acid, and humin (least studied fraction). Humin is comprised of mineral matter, unbound lipids (removable by organic solvents), a bound lipid component (not removable by organic solvents), a bound humic acid component, and an insoluble residue. Evaluation of the interaction of soil and humic materials with herbicides, pesticides, and organic contaminants opens an avenue to ensure that our topsoil is ready for stakeholder use now and in the future. This study would enable researchers to develop better methods of pesticide use and aid in remediation efforts of contaminated soil and groundwater sites.

Performance Goal

Provide information on the fate and transport of herbicides such as atrazine and 2,4-D in soil and the organic matter fraction in soil, humin, by studying the sorption isotherms of atrazine and 2,4-D adsorbed to various sites in soil and humin.

Output Indicators

1. Development of methods to minimize herbicide/pesticide transport through the soil to groundwater and aquifers
2. Develop synthesis strategies for new and improved agricultural herbicides and pesticides that reduce their toxicity, long term fate and transport through the soil to groundwater reservoirs
3. Number of internal and external presentations
4. Number of journal publications

Outcome Indicators

1. Reduced transport of organic contaminants such as herbicides and pesticides into water supplies
2. More rational use of herbicides/pesticides in the agricultural environment

Key Program Components

1. Isolation and characterization of the soil samples and humins sampled from several soil types and locations
2. Removal of the components of humin by Soxhlet-extraction (removing lipids) and bromination (removing all other accessible organic matter)
3. Determination of the atrazine sorption isotherms with various soils and humins
4. Determination of the 2,4-D sorption isotherms with various soils and humins
5. Determination of the effects of pH on the atrazine sorption isotherms with various soils and humins
6. Determination of the effects of pH on the 2,4-D sorption isotherms with various soils and humins studied
7. Determination of the effects of ionic strength on the sorption isotherms of atrazine and 2,4-D with various soils and humins
8. Evaluation of the effects of pH and ionic strength on the sorption of atrazine and 2,4-D to soil and the various components of humin
9. Expansion of the project to include determination of the sorption isotherms of other important herbicides/pesticides such as diazinon, 3,5-dichlorophenol, and trifluralin

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. USDA Agricultural Research Service
3. WVU Experimental Station

Target Audiences

1. WV Department of Agriculture
2. Agricultural researchers
3. Farmers and extension agents
4. Related businesses
5. Chemical and environmental societies

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $182,500

Research Program 4.3 "Waste Energy Recovery Studies"

Statement of Issues

As domestic livestock agriculture increases to meet global demands, new strategies must be developed to handle associated waste that becomes increasingly harmful to soil, water, and air. West Virginia poultry producers must have access to knowledge and technologies that eliminate pollution and concomitantly enhance competitiveness.

Performance Goal

Reduce pathogen and nutrient pollution in watersheds currently impacted by poultry industries while maintaining or increasing market shares

Output Indicators

Results of livestock waste-management research that develops novel products using thermophilic anaerobic digestion (TAD) technologies pioneered in this program
Value-added poultry products including novel fertilizers, aquaculture foods and energy recovered from new livestock waste management technologies
Number of internal and external presentations
Number of journal publications

Outcome Indicators

Reduced coliform pathogen and inorganic nutrient loads in watersheds impacted by the

poultry industry

Increased market share opportunities for US livestock producers when application of this technology turns the livestock waste that was formerly a fiscal detriment into marketable assets

Increased market share opportunities for US waste management industries that expand into the livestock waste management sector using these new technologies

Key Program Components

Characterization and optimization of thermophilic anaerobic digestion (TAD) techniques that utilize microbes to treat poultry wastes

Developing valued-added technologies by assessing the crop fertilizer-value and aquaculture feedstock –value of TAD products

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. State & federal laboratories
3. Other Universities
4. Domestic and international businesses

Target Audiences

1. Waste generators including the hog & poultry livestock producers
2. Forest product industries
3. WV poultry industries

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $555,000

Research Program 4.4 "Microbial Degradation of Waste"

Statement of Issues

The sustainability of both agricultural practices and the natural environment depends significantly on the impact of anthropogenic waste. Agricultural, municipal and industrial wastes may have significant effects on agriculture and the environment depending on how the wastes

are managed. Microbial degradation of waste can be used to alleviate their detrimental effects, and simultaneously produce agriculturally beneficial products.

Performance Goals

Examination of microbially degraded waste adversely or beneficially alters the native soil microorganisms that naturally impact plant growth and agriculture

Output Indicators

1. Determine the impact of microbially degraded animal waste on soil quality
2. Determine the impact of microbially degraded animal waste on populations of beneficial and harmful soil microorganisms that impact plant health and productivity
3. Determine the impact of microbially digested animal waste on rhizosphere microbial community structure and microbial genetic diversity
4. Number of internal and external presentations
5. Number of journal publications

Outcome Indicators

1. Improved soil quality of agricultural land resulting from engineering of soil microbial populations that impact plant health
2. Rational use of animal product-derived fertilizers for crop production and disposal in natural environments

Key Program Components

1. Assessment of the impact of Microbial thermophilic anaerobic digestion (TAD) poultry fertilizer on microbial community structure in the rhizosphere of crops
2. Impact of TAD poultry fertilizer on rhizosphere bacteria known to enhance plant growth
3. Investigate whether antibiotic resistance is transferred from poultry bacteria to soil rhizosphere bacteria

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. Other Universities
3. WV Department of Agricultural
4. Exeter University (UK)

Target Audiences

1. West Virginia poultry farmers
2. Animal waste disposal industry
3. Animal husbandry researchers
4. Agricultural researchers, farmers, extension agents, and businesses

Project Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $58,187

Research Program 4.5 "Characterization of Invasive Species in West Virginia Forests"

Statement of Issues

Ailanthus altissima, commonly known as "tree-of-heaven", is an invasive tree from Asia that has naturalized in habitats disturbed by human activities such as urban areas, roadways, abandoned fields, and strip mines in every state except Alaska. It grows rapidly, produces toxins that inhibit neighboring plants, and produces large numbers of easily dispersed seed. As such, it is a significant crop pest and may become a disruptive component of non-urban forest ecosystems as infrastructures such as roadways, power lines, timber harvesting, and non-timber resource extraction, grow. Forest managers require detailed knowledge of the ability of tree-of-heaven to invade and affect the structure and function of native forests (e.g., succession, disturbance regimes,

productivity, nutrient cycling, and herbivore demographics) to develop effective strategies that prevent its spread.

Performance Goal

Assessment of tree-of-heaven's propensity to expand into and affect secondary succession in forests near urban areas in southwestern West Virginia

Output Indicators

Detailed recommendations for forest management that minimizes the spread of tree-of-heaven

Number of internal and external presentations

Number of journal publications. Specifically, published reports detailing the presence of tree-of-heaven in urban neighboring forest, its rate of spread, and competitive abilities (with native and other invasive species) under a variety of environmental conditions

Outcome Indicators

Increased awareness of the effects of invasive species on native ecosystems

Dialogue with local forest managers regarding forest management practices that emphasize preserving native species composition and ecosystem processes

Key Program Components

1. Determine the distribution, and rate and modes of expansion, of tree-of-heaven, in Kanawha State Forest (KSF), which neighbors the southern edge of Charleston, WV
2. Determine the ability of tree-of-heaven to survive and grow in a range forest gap sizes at KSF
3. Determine how soil nutrient and moisture conditions affect root versus shoot allocation and vegetative reproduction of tree-of-heaven
4. Determine whether above-ground injury increases tree-of-heaven toxicity
5. Determine whether tree-of-heaven is toxic to important native and exotic species that occur in KSF

Internal and External Linkages

1. WVSC researchers and extension agents
2. Forest managers
3. State and federal biologists
4. West Virginia University
5. U.S. Forest Service

Target Audiences

1. Forest ecologists
2. State and federal wildlife, forest, and agriculture biologists
3. Policy makers
4. Timber industry

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $49,687

Research Program 4.6 "Remediation of Industrial Wastewater and Acid Mine Drainage"

Statement of Issues

Industrial wastewater, particularly from chemical plants and coalmines, often is contaminated and thus has limited utility. Furthermore, because of the toxicity of many of the pollutants, this water poses significant hazards to the residents of West Virginia and the world. The major metal contaminants are iron, aluminum, manganese, zinc, and copper, but there are many others in smaller amounts including arsenic, cadmium, and mercury. Traditional approaches for removal of these species give large amounts of mud-like sludge whose disposal often compounds pollution problems by contaminating soil. Solution to these intricate problems would have great impact on the quality of life of all people.

Performance Goals

1. Identify and quantify the metal pollutants in industrial wastewater
2. Develop better remediation methods that will result in better water quality
3. Develop improved methods for the disposal of the solid pollutants after they are removed from wastewater, thus improving soil quality

Output Indicators

1. Develop resins having strong metal ion affinity

2. Fully characterize these resins for possible application to other problems
3. Explore uses for the solid waste from acid mine drainage
4. Develop an environmentally sound method for the removal of aluminum from wastewater, which meets new regulations
5. Communicate the improved remediation methods at meetings and publication in suitable journals

Outcome Indicators

1. Improved water quality
2. Improved soil quality around mine sites and streams
3. Better understanding of wastewater pollution

Key Program Components

1. Obtain water samples from several streams and mine sites in West Virginia. These will be analyzed to determine the exact nature and levels of the pollutants. Variation of these analyses with time will be determined
2. Obtain sludge samples from acid mine drainage treatment sites and subjected to both qualitative and quantitative analyses. Trace levels of toxic metals must be explored carefully

Develop resins with high metal ion affinity

Evaluate resins using the water samples from the natural sources as well as "synthetic" samples prepared on the basis of the analysis of the crude samples above. Stakeholder input from WVSC graduates who have worked in preparation of such resins will be useful. The effect of pH, temperature, etc., on the ability of these resins to complex with metal ions will be studied in detail. This will include careful rate studies

Subject lab-based results to field-testing of the streams and mines where samples were taken

Establish additional test sites as needed

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. Watershed groups, coal and chemical companies

3. Stakeholders

Target Audiences

1. Watershed groups
2. Coal companies
3. Chemical companies

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources — $470,327

GOAL 5. ***Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.***

Research Program 5.1 "Regional Economic Forecasting Model Development"

Statement of Issues

The structure of the American workforce and economy is rapidly changing. Our society is moving from an industrial/manufacturing based economy to one that is largely service-oriented. Knowledge of new technological innovations is critical. West Virginia has been particularly hard-hit by the changing economic structure.

The coal mining industry, a traditional major employer in West Virginia, faces an uncertain future. The "typical" coal miner does not have a high school diploma and little or no marketable skills. As the coal reserves are depleted and coal companies are forced to cut costs due to increasingly strict environmental regulations, thousands of workers have been downsized which has negatively impacted the state's economy in more rural areas. The economic outlook of the state has improved somewhat by an influx of companies specializing in healthcare and manufacturing. Unfortunately, it appears the benefits, as far as higher paying jobs and improved education are concerned, are mainly being seen in the more urban areas of the state. For economic well being of the State of West Virginia, displaced workers must develop skill sets via training to re-enter the workforce.

Performance Goals

1. Increase awareness of industry/employment trends in West Virginia
2. Analyze and supply information to state and local government and community development organizations in order to increase employment and production in the state

3. Assess the competency and skill needs of business and industry in order to re-educate our workforce

Output Indicators

1. Develop correlations to link skill sets to industry needs
2. Decreased unemployment and increased output in the state
3. Number of internal and external publications and presentations
4. Develop correlations to link skill sets to industry needs

Outcome Indicators

1. New business and industry choosing to locate in West Virginia
2. A trained and educated workforce, skilled in the high-demand areas
3. Computer-based predictive socio-economic model for our stakeholders

Key Program Components

1. Conduct a needs assessment and data collection to develop forecasting models
2. Perform a gaps analysis to highlight disparities in perceived industry need and the current workforce skill set
3. Create programs to reconcile and link skill sets to industry needs

Internal and External Linkages

1. WVSC researchers and extension agents
2. WV Research League
3. Business and Industry Development Corporation
4. Mayor's Office of Economic Development
5. WVU and Marshall University
6. Senate for Business and Industry

Target Audiences

1. Local, state and national business communities
2. WVSC researchers and extension agents.
3. Local, state and federal government.
4. Local and state community organizations.

Program Duration

This research will continue for the four-year life of this plan.

Allocated Resources – $190,318

Research Program 5.2 "Improving the Quality of Life"

Statement of Issues

Parents often lack information about adolescent and parenting skills necessary to respond to the challenges of this developmental stage. Society is also confronted with a number of social issues related to adolescents–juvenile delinquency; substance abuse; early sexual activity; teen pregnancy; school dropout; disciplinary problems and increased violence. The nature and quality of the parent/adolescent relationship must be strengthened to help eliminate some of these issues. Current responses focus more on intervention than prevention. Research that evaluates the effectiveness of parent education programs to improve the quality of the parent/adolescent relationship can strengthen families and improve quality of life.

Performance Goals

Evaluate the effect of parent education programs improving the quality of parent/adolescent relationship

Output Indicators

1. Number of parents who engage in new parenting practices
2. Number of parents who report improved quality of parent/child relationships
3. Number of youth who report improved attitudes towards parents
4. Number of journal publications and presentations

Outcomes Indicators

1. Increase in the number of parents who engage in new parenting practices
2. Increase in the number of parents who report improved quality of parent/child relationships
3. Increase in the number of youth who report improved attitudes towards parents

Key Program Components

1. Evaluation of parenting education programs
2. Develop and test parenting education programs based on assessment and modification of existing program models
3. Deliver, monitor, and evaluate new models for parenting education programs

Internal and External Linkages

1. Community based organizations
2. Social service agencies

3. School systems
4. Faith-based organizations

Target Audiences

1. Faith-based organizations
2. Public and private groups currently working with parenting education programs
3. Families with adolescent children, with an emphasis on high-risk adolescents

Program Duration

The programs to be developed will continue for the four-year life of this plan

Allocated Resources – $582,911

B. Cooperative Extension Service Programs

GOAL 1. ***An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.***

Extension Program 1.1 "Fish Yield Verification Trials"

Statement of Issues

West Virginia is in need of a marketable alternative agricultural crop. In recent years, there has been a growing interest to increase the presence of West Virginia in the aquaculture arena. West Virginia's state and congressional delegates are now seeking funds for various aquaculture research activities geared toward increasing the capacity of West Virginia to develop a competitive fish market. The long-term goal for the state's public and private farmers is to have a more efficient and effective production process, thus, enabling growers to expand their market to include major food chains and wholesalers within and outside the state. Both West Virginia University and West Virginia State College have hired aquaculture specialists to assist growers and other relevant entities in assessing the current set ups for trout production.

Performance Goals

Increase fish production and marketing system efficiencies

Output Indicators

1. Efficiency of production system
2. Number of marketable trout produced
3. Total number growers in West Virginia
4. Profitability of growers
5. Total amount of literature published
6. Number of internal and external presentations

Outcome Indicators

1. Increased quantities of fish produced
2. Increased efficiency of production system
3. Increased profitability for farmers
4. Increased market share in the fish national production industry
5. Increased knowledge base in fish production and nutrition

Key Program Components

1. Develop a comprehensive scope of work to present to farmers and relevant agencies on the need, importance and benefits of carrying out such research
2. Farm sites to optimize conditions (e.g. water temperature, diet, water requirement) for trout production
3. Develop a database to record data needed for both the verification of recommendations made by scientists and justification for further related research
4. Increase extension agents and farmer expertise in trout production
5. Increase the presence of West Virginia State College in the aquaculture research and extension arena

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. WVU Extension Service
3. Natural Resources and Conservation Services (NRCS)
4. West Virginia Department of Agriculture
5. WVSC Department of Biology
6. Kentucky State University

Target Audiences

1. Commercial private
2. Fish farmers

Program Duration

This program will continue for the four-year life of this program

Allocated Resources — $400,000

Extension Program 1.2 "The Expansion of Horticultural Activities in West Virginia"

Statement of Issues

Home horticulture is one of the major pastimes for many homeowners across the nation. Interests in horticulture vary from vegetable gardening and fruit production to landscape architecture and turf management. In West Virginia, the interest in horticulture related activities has increased in the last decade. Home landscape beautification and vegetable

gardening are at the center of this heightened resurgence of interest in horticulture. Commercial growers in the areas of greenhouse and nursery management, turf maintenance, and fruit and vegetable production are seeking marketing and production related advice in order to satisfy consumer needs.

Performance Goals

Increase the presence, activity and interest in home and commercial horticulture in the state of West Virginia

Output Indicators

1. Expansion of knowledge base in horticulture
1. Number of participants in horticultural related activities
2. Total number of relevant publications developed
3. Number of participants in the Master Gardener's Program
4. Quality and marketing of products

Outcome Indicators

1. Increase in the visibility of horticulture in the State
2. Increased knowledge of growing fruits, vegetables and ornamental crops
3. Increased marketing and quality production of horticultural crops

Key Program Components

1. Develop a home horticulture manual
2. Dialogue with commercial growers to assess needs
3. Partner with West Virginia University Extension Program to attain greater participation in the Master Gardner's Program
4. Develop a small course in gardening, turf management, landscape architecture, ornamental horticulture, propagation, fruit production, soil science, plant growth and development, floriculture and greenhouse and nursery management

Internal and External Linkages

1. County beautification groups
2. WVU Extension Service
3. West Virginia Department of Agriculture
4. Master Gardener's Programs
5. West Virginia Nurserymen and Landscape Association
6. Nurserymen's Associations
7. Natural Resources and Conservation Services (NRCS)
8. Farm Bureau
9. Agricultural Statistics

10. Meteorological Survey

Target Audience

1. Homeowners
2. Commercial growers
3. Retirees
4. Youth groups
5. Community organizations

Program Duration

This program will continue for the four-year life of this program

Allocated Resources — $350,000

GOAL 2. ***A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education.***

Program 2.1 "Food Allergy Awareness"

Statement of Issues

The list of foods that most commonly cause allergic reactions sounds like a typical grocery shopping list: milk, eggs, peanuts, fish, shellfish, soy, wheat, and corn. While most people can eat these foods, or products containing them, without problems, some
may experience allergic symptoms that make dining an unpleasant and sometimes dangerous experience.

While food allergy symptoms usually are mild, some reactions can be dangerous. Anaphylaxis is a rare, severe and sudden life-threatening allergic reaction to food that causes shock, sudden lowering of blood pressure, or airway obstruction in the
throat or lungs, requiring immediate medical attention. Those who have suffered previous severe reactions to foods should carry an epinephrine kit, which contains a preloaded syringe of epinephrine (a naturally occurring hormone that is also called
adrenaline) that can be promptly injected to treat the reaction. Schools must have emergency kits on-site and train personnel in their use.

The incidence of childhood food-allergies is increasing, for reasons still unknown. A survey done by the Food Allergy Network have found that food-allergic families believe their child's general health was reduced compared to most other children and food allergies limited family activities; while the level of emotional stress on the parents was higher than other families with asthma, epilepsy, etc.

Childhood food allergy has a significant impact on general health perception, emotional distress in parents, and family activities. The general lack of information about food allergies and their symptoms adds to the

stress. It is estimated that 2-5% of children have severe food allergies that can lead to anaphylaxis, yet schools, day care centers, etc. are often not prepared to deal with an allergic reaction. Parents, schools, health-care providers must have up-to-date information about food-allergies and how to treat them.

In urban areas, the awareness of food-allergies is much greater than in West Virginia. In 1994, a Brown University student died after eating chili at a restaurant. The secret ingredient was peanut. The tragedy was well publicized. Because of the sparse population in WV, it is difficult to disseminate information about food-allergy reactions and their possible severity.

Performance Goals

Develop a comprehensive program and informational campaign regarding food-allergies, their increased incidence in children and up-to-date prevention and treatment strategies

Output Indicators

1. Number of children and families affected by food-allergies
2. Number of school personnel reporting increased knowledge about food allergies and how to react in an emergency
3. Number of publications in food-allergies and possible product contamination
4. Number of parents reporting increased awareness

Outcome Indicators

1. Increased awareness of food-allergies
2. Increased knowledge about how to prevent reactions, (i.e., carefully reading labels on all packaged foods and avoiding contamination at restaurants)
3. Increased awareness of food-allergies, prevention and treatment in school settings

Key Program Components

1. Establish a quarterly newsletter and send it to schools statewide to increase awareness
2. Establish parent groups statewide, in collaboration with WVU
3. Conduct a conference at WVSC
4. Develop an information video and visit schools (Parent Teacher Associations) to help increase awareness
5. Establish a website with links to national resources

Internal and External Linkages

1. Public and private schools, pre-schools and day-care providers
2. Health-care providers
3. West Virginia University
4. American Academy of Allergy and Immunology
5. National Association of School Nurses
6. American Dietetic Association
7. Food Allergy Network

Target Audiences

1. Families with food-allergic children
2. Schools

3. Faith-based
4. Youth service organizations
5. General public

Program Duration

This program will continue for the four-year life of this plan

Allocated Resources — $100,000

GOAL 3. ***A healthy, well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices.***

Extension Program 3.1 "Nutrition Education and Wellness System"

Statement of Issues

West Virginia educators, nutrition professionals, and food service employees agree that one of the keys to better nutrition for children is having families that understand, appreciate and follow sound nutritional practices. We recognize that one of the main elements contributing to students choosing health meals centers on the influence they receive from home. Training students and parents to value good nutrition and commit to a healthy lifestyle is a necessary goal as society recognizes the monetary and health benefits associated with practicing good nutrition.

West Virginia is one of the unhealthiest and poorest states in the country (per capita income is the lowest in the country). Positive correlations between poverty and inadequate nutrition raise concerns for the health of the state's children, their readiness to learn and the health of the population in general.

In 1992 West Virginia participated in the Centers for Disease Control Behavior Risk Factor Surveillance System (BRFSS). The report focused on health behaviors that are associated with preventable illness and death. Several behaviors/factors included in the study have nutrition-related implications: hypertension, obesity, sedentary lifestyle and alcohol abuse. Of the 37 states that participated in the study, West Virginia ranked first in the overall measure on unhealthy behaviors. According to the BRFSS study, 35.7% of adult West Virginians were considered obese and another 20.2% were found to be overweight.

In 1993, the State Health Education Council (SHEC) conducted the West Virginia Nutrition Survey to identify the dietary patterns of adults and potential interventions related to chronic disease prevention. This statewide survey of 1,205 adults revealed that:

a) native West Virginians had distinctly less healthful food behaviors than did non-native West Virginians, with the former using less low-fat foods.

b) as education levels increased, so did the consumption of more healthful foods, i.e. skim milk, fruits and vegetables, and whole grains; less than on fifth of respondents had food behaviors characterized as "healthful".

These data provide evidence of a strong need for better nutritional education programs throughout the state. Providing nutrition training to parents will help break the cycle of poor choices and poor health for our children.

Performance Goal

Increase the awareness of good eating habits, nutrition and physical exercise to improve the overall health for the citizens of West Virginia

Output Indicators

1. Number of diet and life-style related diseases in West Virginia, specifically among the limited resource and minority population
2. Number of program participants adopting recommended practices
3. Number of limited resource families who reduce risk factors of chronic diseases through improved eating patterns
4. Number of participants who apply self-monitoring techniques to pursue improved health status
5. Number of presentations
6. Number of informational brochure publications

Outcome Indicators

1. Improved accessibility of nutrition information and education
2. Increased number of participants reporting improved eating practices designed to reduce risk factors for chronic diseases
3. Increased number of participants reporting expanded use of healthy eating habits
4. Increased number of participants incorporating physical activity as well as nutrient monitoring into an overall plan to improve health
5. Increased number of participants who report the use of new management skill for extending food resources while selecting nutritious foods

Key Program Components

1. Identify healthy eating habits
2. Determine the relationship between eating practices and the reduction of chronic diseases
3. Determine the impact of nutrient monitoring and physical activities on overall health
4. Identify the methodology for implementing new management diet systems

Internal and External Linkages

1. WVSC researchers and extension specialists/agents
2. WVSC Community and Technical College
3. Eat Smart-Be Smart
4. Charleston Area Medical Center

5. Social services agencies
6. Faith-based organizations
7. Expanded Food and Nutrition Education Program (EFNEP)

Program Duration

This program will continue for the four-year life of this plan

Allocated Resources –- $400,000

GOAL 4. ***Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture and forestry's complex links with soil, water, air, and biotic resources.***

Extension Project 4.1 "Biotechnology Forum"

Statement of Issues

Biotechnology is among the newest and most exciting research areas in the world. The excitement stems from the potential and proven use this technology as a tool to solve and address many critical issues in areas such as human and animal nutrition, health and physiology; environmental concerns; and animal, human and plant improvement. While the uses of biotechnological procedures are widespread, there is still a rather large sector of the world's population who are still uninformed. As a result, there are a many persons who are opposed to accepting protocols and products that utilize biotechnological means. The purpose of this research will be to develop comprehensive forums to address issues related to the use of biotechnology in West Virginia.

Performance Goals

1. Inform citizens on how the various uses of biotechnology can positively affect their way of life
2. Facilitate networking among the scientists and professionals community

Output indicators

1. Number of citizens informed about the implications and applications of biotechnology
2. Number of forums held with credible leaders in the field of biotechnology
3. Total amount of literature published
4. Identify current and potential biotechnology career opportunities

Outcome Indicators

Increased awareness of how biotechnology is enhancing the quality of life
Increased interest in biotechnology related businesses
Increased career opportunities and employment in the biotechnology related field

Key Program Components

1. Develop a comprehensive forum to address concerns citizens regarding the use of biotechnology in the state of West Virginia
2. Conduct semiannual, or as needed biotechnology information forums
3. Develop a brochure on importance of biotechnology
4. Develop urban school programs in biotechnological applications

Internal and External Linkages

1. WV Institute of Applied Microbiology
2. WVSC Department of Biology
3. WV Department of Agriculture
4. WVU Experimental Station
5. Exeter University (UK)

Target Audiences

1. Concerned citizens/students
2. Conventional agriculturalists
3. Environmental scientist
4. Environmental groups
5. Biotechnology companies
6. Banks and brokers

Program Duration

This program will continue for the four-year life of this plan

Allocated resources –- $300,000

GOAL 5. ***Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.***

Extension Program 5.1 "Youth Development"

Statement of Issues

West Virginia State College is located in Kanawha County, the largest public school district in the state of West Virginia. Operating in a state where only 12% of the population have a college degree and 34% do not have a high school diploma, we face numerous, unique socio-economic problems as far as educating children in this area. The county is very large (914 square miles) with schools operating in extremely rural, poverty-stricken areas and schools in downtown Charleston where unemployment is high and literacy levels are low. Our challenge as an institution of higher education is to find ways to reach the students, teachers, administrators and parents and to use our excellent resources to improve primary and secondary education, starting with Kanawha County. Our resources are well suited to helping develop expanded school programs to supplement and complement the academic curriculum.

The need for increased opportunities for children to learn and develop in safe and drug-free environments outside of regular school hours is clear. Without affordable, high-quality after-school care available to parents who work, many children must care for themselves or be supervised by older siblings responsibilities that distract them from school work. Studies have shown that youth are most at risk of committing acts of violence and engaging in drug use during the hours of 3 and 6 PM. These time frames correlate with parents who are working and children coming home to unsupervised situation. Lacking constructive community activities to engage them after school, children are vulnerable to drug use and gang involvement outside of school hours. In communities without libraries, many children do not have access to books and other information resources or adults who can help with challenging homework; as a result, some of these students may not learn the skills they need to become productive citizens.

Extension youth programs will address these issues, with after school and summer programs for youth. Programs such as Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR-UP), 4-H, Health Science Technology Academy (HSTA) and the Summer Transportation Institute (STI) are designed to reverse the poor academic trends of at risk minority children. WVSC is also expanding are role in the community to offer transitional living for single, homeless women with children and allow them to pursue a college degree.

Performance Goals

1. Identify and organize community leaders in special task forces to support program initiatives
2. Increase the number of youth and adult participation in programs promoting life-long health practices and well-being of youth, families and communities
3. Develop and maintain partnerships with religious, local, state, and regional entities to strengthen families and communities
4. Increase the number of limited resource, minority families who adopt practices designed to create environments that enhance the intellectual, social, and emotional development of the children
5. Increase the number of limited resource families who develop personal and management skills to enable them to achieve economic and social efficiency
6. Expand the number of at risk students who succeed in mathematics and science
7. Increase the number of limited resource students who graduate from high school and seek further education
8. Strengthen the capacity of community agencies and organizations to work together in providing support to parents and families

Output Indicators

1. Number of after-school programs conducted for limited resource children
2. Number of parenting programs
3. Number of limited resource children participating in after-school programs
4. Number of community networks created to assist families, schools, community leaders and local clientele in increasing business development opportunities
5. Number of effective marketing strategies implemented to define and promote program goals related to enhancing families, youth schools, and communities
6. Number of partnerships developed and maintained with religious, local, state, and regional entities to strengthen families and communities
7. Number of programs conducted for aiding the health development of youth
8. Number of educational experiences designed to promote the social development of youth

Outcome Indicators

1. Children and parents who acquire and use more efficient social skills
2. Improve performance in math and science, especially among limited resource students
3. Children reporting an increased sense of self-worth
4. Increased community involvement by parents and youth
5. Increased collaboration with agencies, institutions, businesses, and community based organizations
6. Decrease in teenage birth rates
7. Fewer discipline problems in school

Key Program Components

1. GEAR-UP

WVSC will partner with the five public housing authorities in Kanawha County to provide counseling, tutoring, mentoring and information about college to limited resource children in grades k-12.

2. Summer Transportation Institute (STI)

Sponsored by the U.S. Department of Transportation ($50,000), the STI is four-week residential program for entering 8th, 9th, and 10th graders that provides opportunities to learn about the four modes of transportation (road, rail, water, and air).

3. 4-H Programs

Youth Development Extension Specialists will work in conjunction with WVU Kanawha County Extension Office to provide academic, recreation, and social activates for the participants.

4. Youth Entrepreneurship

Programs to improve the leadership, business acumen and critical academic skills of youth.

5. Health Sciences And Technology Academy

This project is a partnership between West Virginia University, West Virginia Rural Health Education Partnership and Appalachian communities. It brings minority and disadvantaged students and their teachers to campus each summer for clinic, laboratory, and classroom training and enrichment activities

6. WVSC-H.O.U.S.E.

(Helping Our Undergraduates Succeed in Education). Funded by the Housing and Urban Development HBCU Program, WVSC received $400,000 to build a dormitory and provide transitional housing and an opportunity to go to college for up to 14 high-risk youth a year.

7. Youth-At-Risk

Further develop programs to assist the highest-risk youth in our community. Our Youth Development Specialist and Workforce Preparation Specialist are working with WVU Extension Service to expand and/or develop programs.

Internal and External Linkages

1. Kanawha County Schools
2. West Virginia University Extension
3. Daymark
4. YWCA
5. WVSC Departments of Education and Social Work
6. Community organizations
7. Faith-based

Target Audiences

K-16 at risk youth

Program Duration

All these program components will continue for the four-year life of this plan.

Allocated Resources — $ 1,000,000

Extension Program 5.2 "Family and Community Development"

Statement of Issues

Many of the socio-economic issues present in our community are attributed to the lack of education. An educated population is the key to long-term economic development. WVSC seeks to expand its presence in the Kanawha Valley to assist families and the community. The Department of Land-Grant Programs will conduct a needs assessment to identify gaps in existing social services. This information will be used to develop and expand existing projects that address issues including domestic violence, homelessness, adult illiteracy, teen pregnancy, substance abuse and internet safety. These programs will be delivered by the extension specialists through community centers. Information collected on these issues will be disseminated to parents, teachers and the community-at-large. In addition, we will develop programs to assist limited resource families in their pursuit of life-long learning opportunities, family financial planning and higher education.

Performance Goals

1. Increase the presence of WVSC in Kanawha County and our service area
2. Collaborate with social service organizations and the school system to address these needs
3. Encourage our youth and adults to seek to continue their education
4. Inform and educate the community about critical social issues

Output Indicators

1. Increase awareness of the need for community change
2. Number of participants in community/family programs
3. Number of youth leadership projects
4. Number of community partnerships

Outcome Indicators

1. Increased number of participants in family programs
2. Increased number of participants furthering their education
3. Increase number of citizens graduating from high school and seeking post-

secondary education

Key Program Components

1. **WVSC-YWCA Transitional Living Community (TLC) Phase II**

   WVSC partnered with the Charleston Area YWCA/ Sojourners to apply for a second HUD/HBCU grant. Homeless and/or formerly battered women (and their children) will live in on-campus apartments for up to two years while they attend college

2. **Community and Parent Education**

   Provide information on family issues to parents, teachers and community agencies. Topics covered include but are not limited to: family violence, internet safety, substance abuse, and community resources available.

3. **Assessment of Community Needs**

   Identify relevant social issues and provide the necessary training to groups and conferences. This program will be constantly modified based on the needs of the community as well as updated research and information available to staff.

Internal and External Linkages

1. Local schools
2. Faith-based community organizations
3. Business and industry
4. Social service agencies
5. WVSC Departments of Education, Social Work and Business

Target Audiences

1. Youth
2. Families
3. Displaced or unemployed (underemployed) workers
4. Displaced homemakers

Program Duration

These programs will continue for the four-year life of this plan

Allocated Resources – $650,000

Extension Program 5.3 "Community and Economic Development"

Statement of Issues

As an institution of higher learning, WVSC has the responsibility to offer programs that will train future and displaced workers in areas where there is a need. WVSC, and our businesses and industries need to continually communicate to update the College's academic and technical programs. Making these programs readily available to displaced or unemployed workers and non-traditional students will allow them to further their skills and consequently their socio-economic status.

Many communities in West Virginia are isolated due to the state's topography. In order to conduct and reach the population in need. WVSC will open a number of community centers, where computer literacy and general literacy courses can be conducted.

Workforce preparation is a major issue and will be a strong component at each of our outreach, community centers and at the WVSC Community and Technical College. WVSC will seek to develop a Community Development Corporation to help train workers, assist limited resource individuals to obtain low-interest loans. The CDC will also serve as a business incubator to help minority owned, start up business succeed.

Performance Goals

1. Offer programs to train or re-train workers at locations that are convenient and inexpensive
2. Offer programs to enhance the skills of youth and their ability to become self-sufficient
3. In community centers, people will feel comfortable and therefore participate in the programs. Offer GED courses, College 101 and basic literacy programs in order to begin or continue the lifelong education process

Output Indicators

1. Number of participants enrolled in continuing education courses
2. Number of adults seeking job-training programs
3. Number of youth involved in entrepreneurial training
4. Number of participants who are more self-confident and ready to seek further education or employment
5. Increase in the number of minority owned businesses

Outcome Indicators

1. Increased adult literacy rate
2. Increased number of community centers and community development projects offered by WVSC
3. Increased number of youth who become self-sufficient

4. Increased number of qualified workers who acquire basic skills

Key Program Components

1. Booker T. Washington High School community center
2. Off-campus community centers.
3. Creating a community development corporation at WVSC in Institute
4. Youth Entrepreneurship Programs
5. WV Clearinghouse for Workforce for Education

Internal and External Linkages

1. City and county governments
2. Community and social service agencies
3. Schools and vocational tech programs
4. Faith-based organizations and others
5. WV regional workforce development taskforce

Target Audiences

1. Youth and young adults
2. Displaced workers
3. Unemployed population
4. Workers in need of job-training and workforce skills

Program Duration

Programs will continue through the four-year life of this plan

Allocated Resources – $800,000

III. OVERVIEW OF RESEARCH & EXTENSION PROGRAMS

Cooperative Research and Technology Development Programs

Goal 1.

Research Program 1.1	Crop/Plant Growth Modification and Development
Research Program 1.2	Rapid Crop and Soil Assessment Studies

Goal 2.

Research Program 2.1	Development of Anti-fungal Agents
Research Program 2.2	Microbe Reduction and Bioprobe Detection

Goal 3.

Research Program 3.1	Protein Replacement for Aquaculture Diets

Goal 4.

Research Program 4.1	Detection of Environmental Toxins in Soil and Groundwater Supplies
Research Program 4.2	**Soil Remediation Studies**
Research Program 4.3	**Waste Energy Recovery Studies**
Research Program 4.4	**Microbial Degradation of Waste**
Research Program 4.5	**Characterization of Invasive Species in West Virginia Forests**
Research Program 4.6	**Remediation of Industrial Wastewater and Acid Mine Drainage**

Goal 5.

Research Program 5.1	**Regional Economic Forecasting Model Development**
Research Program 5.2	**Improving the Quality of Life**

Cooperative Extension Services Programs

Goal 1.

Extension Program 1.1 Trout Yield Verification Trials

Extension Program 1.2 The Expansion of Horticultural Activities in West Virginia

Goal 2.

Extension Program 2.1 Food Allergy Awareness

Goal 3.

Extension Program 3.1 Nutrition Education and Wellness System

Goal 4.

Extension Program 4.1 Biotechnology Forum

Goal 5.

Extension Program 5.1 Youth Development

Extension Program 5.2 Family and Community Development

Extension Program 5.3 Community and Economic Development

FUNCTION	GOAL 1	GOAL 2	GOAL 3	GOAL 4	GOAL 5
Cooperative Extension Service Projects	Extension Program 1.1 Extension Program 1.2	Extension Program 2.1	Extension Program 3.1	Extension Program 4.1	Extension Program 5.1 Extension Program 5.2 Extension Program 5.3
Cooperative Research and Technology Development Projects	Research Program 1.1 Research Program 1.2	Research Program 2.1 Research Program 2.2	Research Program 3.1	Research Program 4.1 Research Program 4.2 Research Program 4.3 Research Program 4.4 Research Program 4.5	Research Program 5.1 Research Program 5.2