

## APPENDIX A

### PROJECT PLAN EXAMPLES

#### **Project Purpose**

Many school children do not have access to healthy fruits and vegetables (ISSUE). The School Nutrition Association will subsidize installation of salad bars in forty schools to increase access to nutritious fruits, vegetables and nuts in school breakfasts and lunches (OBJECTIVE). Not only will this result in increased purchases from specialty crop growers, but the evaluation component also will provide a model for other schools in their efforts to market healthy meals to children (IMPORTANCE). This project has not been submitted or funded by another Federal or State grant program.

#### **Potential Impact**

In 2008, according to USDA, National Agricultural Statistics Service (NASS), the State's specialty crop industry occupied 3100 acres and had a value for utilized production of \$20 million. This is evidence of the success and potential for this program. New specialty crop varieties being developed through this program will enable the State's 150 farmers (# OF BENEFICIARIES) to be competitive in growing and marketing these specialty crops (HOW BENEFICIARIES WILL BE IMPACTED). These new crops could provide \$10 - \$15 million in additional farm income (POTENTIAL ECONOMIC IMPACT).

**Expected Measurable Outcomes** (*this section is extremely important, so please review all the information below.*)

#### Steps to Developing Outcome Measures

Whenever possible, the outcomes should include a goal, performance measure, baseline, and a target. The following four steps provide guidance on how to develop outcome measures.

1) *Determine what the project will accomplish, i.e., the intended results of the project, generally expressed as a GOAL or OBJECTIVE.*

Goals or objectives should be: a) based on a needs analysis and be specific, realistic results you hope to achieve through the project activities; b) specific; and c) outcome-oriented. Outcome-oriented objectives identify the ultimate result, while the work plan activities identify how you intend to achieve the objectives. When developing outcome-oriented objectives, ask yourself "why" are you performing each grant activity; and specify not only what will be achieved, but also when those results will be achieved.

2) *Figure out how to measure the results and select the PERFORMANCE MEASURE.*

For each objective identified in step 1, select the performance measure. Performance measures are measures/indicators used to observe progress and measure actual results compared to expected results. They are usually expressed in quantifiable terms and should be objective and measurable (numeric values, percentages, scores and

indices); although in certain circumstances qualitative measures are appropriate.

*3) Determine the BASELINE for each measure and set TARGET goals for future performance.*

For each measure identified in step 2, determine the baselines against which you will measure. Baselines are usually determined by researching past circumstances in the area you are trying to measure. As an alternative, you may use benchmarks established by third parties accepted as the standard-setters in your industry. If data does not exist, describe the lack of data. It may be appropriate in the first year to set vaguer targets, such as “improvement” where any increase represents outcome achievement, and set more concrete targets in subsequent years when baseline data is available. Use the baseline data to set targets for the quantity of change expected. Targets may be framed in terms of:

- a) Absolute level of achievement (ex: feed 150 homeless people);
- b) Change in level of achievement (ex: feed 150 homeless people, 35 more than last year); or
- c) Change in relation to the scale of the problem (ex: feed 150 homeless people, approximately 10% of the city’s homeless population.)

If you are starting up a new project or trying new approaches remember that little or no measurable progress will be evident in the project start-up phase. This delay in seeing measurable results should be reflected in target-setting. When setting targets, you should take into account external factors that influence your success. You may have a grand ultimate goal, but you should view annual targets as small steps toward that ultimate goal.

You may also want to set stretch goals by using benchmarks as your targets. Benchmarks tell you how the rest of the industry is doing; when you gather data for benchmarks, you look at the results of other organizations serving your type(s) of customers, doing your type of work. In your State plan, you may want to stick to a modest level of planned achievement and reserve your stretch goals for internal use. Another alternative is to include minimum and maximum targets in your application. For example, “We plan, at a minimum, for a 5% increase. However, we will strive for a 10% increase, which our data shows is possible if all external factors work in our favor and our new methodology yields the same results in the demonstration phase.”

*4) Develop your performance monitoring plan or data collection plan.*

Define who your data sources are and how the data will be collected. If the project involves a survey, provide some information about the nature of the questions that will be asked, the methodology to be used and the population to be surveyed. If a draft questionnaire is available, you may want to include a copy with the application. Outline how data gathered will be used to correct deficiencies and improve performance, both as it gathered and analyzed and in subsequent project periods. This data collection plan should be integrated into your work plan and budget.

### Examples of Outcome Measures

The following are examples of outcome measures. They do not include examples of a performance monitoring plan.

#### *Example 1*

The GOAL of this project is to promote specialty crop X in Mexico in order to increase the volume.

Volume Increase:

BASELINE 2007: Actual volume (20# equiv. cases) of specialty crop exported to Mexico: 53,969

TARGET 2008: 60,000

TARGET 2009: 70,000

TARGET 2010: 80,000

PERFORMANCE MEASURE: Derive from specialty crop commission assessment reports at the end of each year.

#### *Example 2*

Increase the number of specialty crop farmers following Good Agricultural Practices (GOAL) from the current 18 (BENCHMARK) to 55 in two years (TARGET) measured by the number of GAP audits passed (PERFORMANCE MEASURE).

#### *Example 3*

Increase fruit and vegetable purchases (GOAL) from the current level of \$2.50 (BENCHMARK) to at least \$3 per enrolled student in awarded schools in one year (TARGET) measured by bi-annual school reports (PERFORMANCE MEASURE).

#### *Example 4*

Work directly with specialty crop industry X to develop a uniform tool to access the health of their specialty crops to give the industry early warning of potential problems in order to optimize their management practices (GOAL). No such tool currently exists (BENCHMARK). The success of the evaluation will be measured by interviewing 20 stakeholders at the end of three years to determine if they developed the tool (TARGET and PERFORMANCE MEASURE).

#### *Example 5*

Develop a predictive model for the spread of the specialty crop disease, an analysis of virus resistant varieties, and a foundation for an integrated pest management (IPM) strategy to combat the disease (GOAL). No such model currently exists (BENCHMARK). The information will be shared with more than 700 tomato growers, increasing awareness of the model, at the 2008 conference break-out session (TARGET) measured by attendance at the session (PERFORMANCE MEASURE).

#### *Example 6*

Increase visits to the Specialty Crop Website (GOAL) 25% over the course of one year (TARGET) from the current 9,000 annual hits (BENCHMARK) by measuring website visits each month over the next year (PERFORMANCE MEASURE).

### Example 7

Increase consumer awareness of specialty crops by distributing 1000 pieces of informational materials containing locations where to purchase specialty crops (GOAL). Six months after distribution, survey 50 locations (PERFORMANCE MEASURE) to determine if sales increased by 25% (TARGET) from the level before distribution of marketing materials (BENCHMARK).

### Work Plan

<b>Example 1 Project Activity</b>	<b>Who</b>	<b>Timeline</b>	<b>Budget</b>
Assemble the specialty crop steering committee to provide direction throughout project	Agricultural Marketing Council, specialty crop industry representatives from the mushroom, apple, and peach councils	January 2008	\$500.00
Develop statement of work for literature review	Ag Marketing Council	January	\$0.00
Procure literature reviewer	Ag Marketing Council	January – February	\$1000.00
Conduct literature review on the post-harvest nutritional content of specialty crops and report gaps to steering committee	ABC Consultant	February - March	\$5000.00
Prioritize research gaps; develop/issue Request for Proposals (RFP) for original research	ABC Consultant	March - April	\$500.00
Receive proposals; distribute to steering committee	ABC Consultant	April - May	\$100.00
Review and select proposals	Specialty crop steering committee	April - May	\$0.00
As appropriate, refer proposals to individual commodity research and promotion programs	Specialty crop steering committee and individual research and promotion programs	April - May	\$0.00

Develop and execute research grant agreements for selected projects	Ag Marketing Council	May - June	\$250.00
Obtain progress reports from researchers; synthesize for steering committee	Ag Marketing Council	September, December, March 2009, June 2009	\$0.00
Disseminate research results to steering committee and SCBGP-FB showing progress toward project outcomes	Ag Marketing Council	June 2009	\$500.00

### **Project Oversight**

The Director of Marketing and Development, John Doe, will work directly with the individuals identified as representing each partnering entity. Mr. Doe will coordinate the execution of cooperative agreements with each participating entity and monitor progress throughout the year long grant period. He will contact the principals of each project by phone at least once during each quarter to determine if the projects are on-track.

**Project Commitment:** Provide the following information in this section:

- Who supports this project?
- How will a grant partners work toward the goals and outcomes of the project?

## Example 2

### **Connecticut Agricultural Experiment Station** ***Enhancing the Competitiveness of Locally Grown Salad Greens*** ***Grown Under Protected Cultivation in Greenhouses***

**Abstract:** Locally grown produce is fresh and has a different composition than produce that has been in storage or transit for days or weeks. The greater content of vitamins and other metabolites is a great selling point for promoting the use of locally grown food. Production of salad greens in hydroponics in Connecticut has the potential to significantly increase the economic returns for Connecticut greenhouse operations. We propose to: 1) Develop greenhouse environment and fertilizer protocols to maintain high nutritional values of vegetable crops grown in various seasons of the year, and 2) Determine the nutritional value of locally grown salad greens and compare these values to those of the same crops available in supermarkets that were produced in distant regions. 3) Examine how changes in nutrient solution composition will affect the value of salad greens for human nutrition. We will examine how tissue composition of lettuce and spinach grown in hydroponics in a greenhouse in Connecticut varies with respect to environmental variables such as light and temperature, and to changes in fertilization or composition of nutrient solution. These studies will identify the conditions that lead to concentrations of metabolites that are optimum for human nutrition.

**Project Purpose:** Protected cultivation in greenhouses extends the production season of vegetables in Connecticut beyond the few summer and fall months allowed by open field production. Greenhouses can provide locally grown, fresh vegetables to Connecticut consumers year-round. It is possible to increase the production of these crops, and the quality of specific compounds in plant tissue that are important for human nutrition, by manipulating the environment and fertilization within the greenhouse. Plants can be kept free of pesticides since most pathogens and diseases can be addressed using integrated pest management techniques in the contained environment. Hydroponics allows the control of the concentration and composition of fertilizer that plants take up, and thus provides another level of control of plant tissue composition.

Locally grown vegetables have a greater content of vitamins and other metabolites is an appealing selling point to consumers for enhancing the consumption of locally grown food. We will determine the relative amounts of nutrients in representative samples of locally grown salad greens, such as spinach and lettuce, and compare these nutritional values to greens that have been transported from distant areas of the U.S. or other countries, and sold through nationally branded supermarkets and food outlets.

A recent occurrence of the human health problems that can be associated with nonlocally grown food has been documented by the Associated Press (July 22, 2009) that announced a recall of approximately 22,000 cartons of romaine lettuce because the product may be contaminated with salmonella, an organism that can cause serious and sometimes fatal infections. The lettuce was sold to retail, wholesale and food service outlets across the United States, Canada and Puerto Rico. This illustrates one danger of human consumption of food grown in distant regions under unknown conditions. It also illustrates the time delay this produce has in shipment or storage (up to four

weeks), which results in diminished nutritional value of the crop.

Hydroponics was originally defined as crop growth in mineral nutrient solutions, with no solid medium for the roots. However, the distinction between hydroponics and soilless culture of plants is often not understood. Most container plants are produced in soilless media, however, this is not hydroponics because the medium provides mineral nutrients via slow release fertilizers, cation exchange and decomposition. Greenhouse growth of vegetables in peat bags is often termed hydroponics, because a majority of the fertilizer is provided in solution. Advantages of soilless culture include faster growth combined with relative freedom from soil diseases. Hydroponic crop growth is consistent and the quality of produce is excellent. There is also a considerable reduction in growing area, weeds are practically non-existent, and there is no soil to wash off the produce. Standard methods and automatic operations mean less labor and less cost. Hydroponics allows rapid transfer of plants from one location to another during transplant and to increase spacing. This is of great benefit for salad greens.

Marketing studies and food sales indicate that consumers who are concerned about the nutritional value of the food they eat, will pay more for fresher vegetables and food produced under safer conditions that maximize nutritional value. More and more, consumers prefer locally grown produce that is fresh, to that of produce grown and shipped from distant lands. Consumers now want to know the conditions under which their vegetables are grown, rather than purchasing produce from anonymous farms, under unknown conditions. Research in hydroponic production of salad greens in Connecticut has the potential to significantly increase the economic returns for Connecticut greenhouse operations, owned by farmers and local growers, involved in vegetable production.

**Potential Impact:** Greenhouse growing of crops is extremely important to Connecticut agriculture. Connecticut leads New England in net farm income. In 2004, the cash value of all vegetable crops grown on approximately 10,000 acres in Connecticut increased to \$24.8 million. Agriculture in Connecticut has diversified, leading to smaller farms and more farmers growing food crops. The NASS reported an increase to 4,200 farms in 2002 (from 3,900 farms in 2000). Sixty-four percent of these farms are less than 50 acres in size, and many such operations use greenhouses to grow vegetables to sell. Currently, there are only a few growers who use hydroponics to produce salad greens. The ability to influence the nutritional value of these crops will help to generate interest in a new expansion in the popularity of hydroponics - directly because this will translate into increased consumer appeal and potential increased sales. This research project, which will publicize the nutritional value of CT grown crops, will improve the retail value and income of growers who produce salad greens.

The marketing of food grown in Connecticut has shifted from wholesale contracts with local supermarkets to direct on-farm retail sales. Several topics related to this research area have been issues of concern for stakeholders and members of the Connecticut Greenhouse Growers Association, CT Farm Bureau, NOFA, and the New England Vegetable and Berry Growers Association. Several high schools now have or are

designing projects that produce salad greens and other vegetables using hydroponics.

**Expected Measurable Outcomes:**

Communicate to CT farmers through the CT Farm Bureau and the Northeast Organic Farming Association (NOFA) the difference in nutrient content of locally grown food compared to that of out-of-state salad greens shipped in.

- Provide information to CT farmers and growers so that they can easily communicate this information to their customers at farmer's markets and other sales venues (mailing lists of several hundred farmers in CT).
- Provide this nutritional information to the general public attending Station events (attendance in the thousands), to the CT Garden Club, and to agricultural and horticultural organizations in the State.
- Communicate to CT farmers through bulletins and presentations how nutrient content can be altered by changing fertilizer protocols
- Disseminate the outcome of this research to farmers, growers, and other interested stakeholders in CT through CAES published Bulletins and Fact Sheets which are distributed to the public at all of our events and by public request. Results of this research will also be available to CT farmers and growers and the general public via the Station's well-trafficked web site (1.75 million page views in 2008).
- Disseminate this information to the scientific and agricultural community through scientific journal publications (average of 2 per year).

*Goals:*

1. Develop greenhouse environment and fertilizer protocols to maintain high nutrition values of vegetable crops grown in various seasons of the year. Lettuce and spinach will be grown in water solution to maintain high nutrition values of vegetable crops grown in various seasons of the year. At the normal size for harvest, plants will be sampled and placed on dry ice. These samples will be freeze dried and analyzed for various nutrients. These nutrients will include elemental composition, including N, P, K, Ca, Mg, Fe. Other plant metabolites that have value for human nutrition will be determined. These include soluble sugars, organic acids, amino acids, and soluble protein. The appearance and quality at harvest, and tissue composition will be related to values for sunlight, temperature, and nutrient solution composition during growth.
2. Determine how changes in nutrient solution composition will affect the value of salad greens for human nutrition.
3. Determine the nutrition value of locally grown salad greens and compare these values to those of the same crops available in supermarkets that were produced in distant regions. Fresh greens will be obtained from local growers that produce them conventionally, organically, or in hydroponics. The plant tissues will be preserved and analyzed as described above. Dr. Gent has the support of many CT growers for this project. They will provide samples as required for the testing described above. These growers include a conventional farmer, an organic

farmer, and a farmer who produces salad greens in hydroponics.

4. Disseminate this information to the agricultural and farming community, to the general public, and to interested stakeholder organizations. The information developed under goals 1 and 2 will be written up as facts sheets and a Bulletin to be published by the Connecticut Agricultural Experiment Station. This information will be available on the Station web site and by request. Dr Martin Gent will give talks to the public and at grower meetings to publicize this information.

**Work Plan:**

<b>Goal 1:</b>		
Project Activity	Who	Timeline
Consecutive plantings in hydroponics	Dr. Martin Gent and research technician	January – September 2010
Harvest plots when greens are marketable size	Dr. Martin Gent and research technician	April – December 2010
Analyze composition of plant tissue samples	Dr. Martin Gent and research technician	June – December 2010
<b>Goal 2:</b>		
Several plantings in hydroponics	Dr. Martin Gent and research technician	August – September 2010
Harvest plots when greens are marketable size	Technician & assistant	October – December 2010
Analyze composition of plant tissue samples	Technician & assistant	October – December 2010
<b>Goal 3:</b>		
Collect samples of salad greens from local growers	Dr. Martin Gent	April-October 2010
Analyze composition of plant tissue samples	Dr. Martin Gent and research technician	June – December 2010
<b>Goal 4:</b>		
Write bulletins and fact sheets with information developed above	Dr. Martin Gent	December 2010

## **Project Activity Who Timeline**

### **Budget Narrative:**

- 1.) Personnel – \$11,908
  - a. Technician, Summer worker
  - b. Percent of Full Time Equivalent (FTE): 0%, 100% for 3 months
  - c. Personnel Salary: Technician - \$6,035, Summer worker - \$6,615
- 2.) Fringe Benefits Rate based on salary
  - d. Technician \$2,897 (48%), Summer worker \$2,315 (35%)
- 3.) Travel - N/A
- 4.) Equipment – N/A
- 5.) Supplies - \$5,060
  - e. Root medium, fertilizer - \$1,350,
  - f. Chemicals, analysis electrodes and columns – \$2,850
  - g. Misc parts to maintain greenhouses and analysis equipment - \$860
- 6.) Contractual –N/A
- 7.) Other – N/A
- 8.) Indirect Charges - \$2,078, (9.1%)
- 9.) Program Income: N/A

**Total Budget: \$25,000**

**Project Oversight:** Dr. Martin P. N. Gent. Dr. Gent received a PhD in physical chemistry from Yale University in 1975 and began work at the Station in 1978. His current research examines the effect of the nutrient solution in hydroponics on the composition of tomato, lettuce and spinach and the how composition of salad greens is affected by plant size and diurnal variation in sunlight. He has authored 200 scientific publications.

### **Project Commitment:**

This project will be completed with commitment of personnel and resources of CAES. This includes laboratories in New Haven and Lockwood Farm in Hamden. Laboratories are outfitted with state of the art equipment for analyzing plant composition. Personnel will include Dr. Gent, and part time 10%) Research Technician and a summer research assistant.