Sustainable
Warren Wilson College Food System

Sustainability Plan

“Bringing sustainable action and quality food to practice”

December 2009
Warren Wilson College Food Systems Sustainability Plan
Prepared by the Sustainable Foods Policy Task Force
Submitted November 15, 2009

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1. Introduction

1.1 Mission of this document

This document is the outcome of the Warren Wilson College (WWC) Sustainable Foods Policy Task Force, a President-mandated committee sanctioned in the College’s Climate Action Plan (CAP) to, “in collaboration with dining services provider Sodexo,” elaborate a sustainability decision-making framework applicable to food systems at the College. The purpose of this directive is “to measure and set forth goals for reduction of the carbon footprint of the food supply chain to be included in the College’s annual greenhouse gas emissions inventory” while recognizing that “global sustainability challenges” like climate change and food security, are themselves functions of “complex interconnections of economic, environmental, and social/cultural factors” that must be addressed simultaneously.

1.2 The Context: Sustainability in practice at Warren Wilson College

**Sustainability** is a relatively enigmatic term that has come to mean many things to many people. The most commonly cited definition is (one of) the most ambiguous, originally laid out by the Bruntland Commission in 1989: “[to meet] the needs of the present without compromising the ability of future generations to meet their own needs.” However, there is now clear scientific evidence that humanity is living unsustainably—particularly true here in the United States—and that an unprecedented collective effort is needed to return human use of natural resources to within sustainable limits. The core of mainstream thinking on sustainable development is an idea of three dimensions: environmental, social/cultural and economic sustainability. These have been conceptualized as interlocking circles (to show they are not mutually exclusive and can be mutually reinforcing) depicting the microcosm, or *triple bottom line*, of sustainability, as well as concentric circles (to acknowledge the fact that the economy is a component of society which in turn is both bounded by and dependent upon, the environment) representing the macrocosm.

Warren Wilson College has been evolving its institutional practice of sustainability since its early days as the Asheville Farm School in 1894. In recent decades, the College has formalized a number of commitments to environmental responsibility and sustainability designed to guide community practices. In 2000, when Warren Wilson signed the Talloires Declaration, the College pledged to “create an institutional culture of sustainability.” Then in 2003, trustees added “environmental responsibility” to the College’s mission statement. Finally, in 2007, President Sandy Pfeiffer and the President’s Advisory Council (PAC) adopted a sustainable decision-making process, committing to an intentional use of these principles when planning for the College. This commitment to the practice of sustainability at WWC is summarized in its CAP, and reiterated on its website: “As a roadmap for community engagement, deep thinking, and accountability to present and future generations, sustainability frames the scope of our concerns. It reveals the extent to which the life we choose impacts our global family. We educate for sustainability at Warren Wilson College because our mission directs us to prepare students for responsible community engagement that promotes the common good.”

Procurement of goods and services by WWC and its contract providers represents a challenge and an opportunity to put this overarching policy into practice. In terms of food systems, the unique agricultural activities and food production capabilities of WWC are also implicated in this endeavor.

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1.3 Sustainability in Food Systems

A food system is comprised of multiple, often disparate, systems of production, processing, marketing, distribution, catering/preparation, consumption, and waste management. Modern, conventional food systems employ economies of scale embodied by vertical integration, economic specialization, high levels of technology & pollution, and global trade, largely based on the availability of inexpensive fossil fuels. By applying the triple bottom-line model, a sustainable food system, then, can be envisioned that breaks the cycle of fossil-fuel dependence, promotes regional food security and socioeconomic equity, while curbing pollution and the dominance of agribusiness in food systems. Along these lines, the American Public Health Association (APHA) defines a sustainable food system as "one that provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment. A sustainable food system also encourages local production and distribution infrastructures and makes nutritious food available, accessible, and affordable to all. Further, it is humane and just, protecting farmers and other workers, consumers, and communities." A more goal-oriented definition comes from the UK Department of Environment, Food, and Rural Affairs (DEFRA). It has defined “sustainability in food and farming [as] systems of production, processing, marketing, distribution, and catering which meet the following five broad aims to 1) Raise production and process standards, 2) Increase tenders from small and local producers, 3) Increase consumption of healthy and nutritious food, 4) Reduce adverse environmental impacts of production and supply, and 5) Increase capacity of small and local suppliers to meet demand. Additional objectives refer to increasing demand for organic food, improving choice for ethnic minorities, reducing waste, providing better conditions for catering staff, and improving data collection.”

From a purchasing perspective, this means considering not only the cost and quality of products, but also social and environmental factors associated with each purchase. From an institutional production perspective, this means considering not only farm profitability, environmental/biophysical “stewardship”, and socio-economic prosperity, but also institutional population and involvement in food systems. As a practical matter, it requires seeking both ‘value’ and to satisfy ‘values,’ while assuring the security and continuity of supply and the smooth operation of the facility. With increased flows of information about product needs, product qualities, buyer interests and supplier capacities, sustainable purchasing is the basis for continued efforts to add value to products, and to improve social and environmental performance throughout the supply chain. It can also facilitate more mutually beneficial relationships between buyers and sellers.

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5 “Local” refers to the geographic area delineated by Appalachian Sustainable Agriculture Project’s (ASAP) Appalachian Grown™ program, encompassing 57 counties within 175 miles from WWC in five states. See sect. 3.1.1.1.2 (Food Miles) for more information.

6 The policy is explained in Defra’s PSFPI Guidance for buyers and their internal customers available online at [http://www.defra.gov.uk/FARM/sustain/procurement/pdf/foodprocure.pdf](http://www.defra.gov.uk/FARM/sustain/procurement/pdf/foodprocure.pdf)
1.4 Vision Statement
Warren Wilson College cultivates a campus food culture that celebrates the pleasures of producing, preparing and consuming sustainable food. We will promote participation of the campus community in a food system that contributes to economic vitality, environmental well-being, and the quality of life on campus, in our local community and throughout the WWC campus foodshed.7

1.5 Policy Statement

1.5.1 Strategies, Standards and Compliance
In a concerted effort to reduce adverse impacts arising from production, supply, and consumption of foods provided by Warren Wilson College and its contracted service providers, we will work with our food suppliers, local farmers and community-based organizations to increase the availability of locally-sourced, sustainably-produced food in an effort to develop a vital local economy, a healthy environment and a high quality of life on campus, in our local community and throughout the WWC campus foodshed.6

The procurement of food by the College and its dining services represents an important tool to put this overarching policy into practice. Therefore, a sustainable purchasing policy seeks to optimize the mix of foods used by campus food services according to the following objectives that, together, comprise an integrated, goal-oriented definition of sustainable food in terms of supply chain management:

First, we seek to optimize the use of foods produced sustainably on campus, keeping agricultural productivity in line with campus populations and encouraging self-reliance in appropriate food products or categories; Second, we endeavor to increase the use of fresh, minimally processed foods that meet minimum standards that ensure socio-ecological sustainability of production and supply while supporting best practice in animal welfare; Third, we aspire to minimize food miles8 incurred through supply channels, supporting the local/regional economy; Fourth, we aim to increase/maximize the producer's share of the food dollar9, emphasizing (more direct) purchasing from producers or producer cooperatives.

Any changes in our food purchasing policies and production or procurement practices will minimize adverse operational impacts, be economically viable, and whenever possible, be cost-negative and revenue neutral.

Finally, any policy geared toward institutional sustainability in food systems would be incomplete without a provision to reduce adverse environmental impacts arising from these institutional food systems operations as they exist, including greenhouse gas emissions, use and disposal of nonrenewable resources, and the production and export of waste from production and catering/consumption activities.

To ensure progress toward the goals of this policy, the creation of a Campus Food Policy Council is necessary to review and evaluate food system performance and compliance on a semi-annual basis.

7 A foodshed consists of everything between where a food is produced and where a food is consumed – the land it grows on, the routes it travels, the markets it goes through, the tables it ends up gracing. First used in the early 20th century to describe the global flow of food, "foodshed" has recently been resurrected to discuss local food systems and efforts to create more sustainable ways of producing and consuming food. An Integrated Regional Foodshed model, recently developed by planners at Columbia College & MIT, suggests that the majority of the food provided to a region be produced within a defined geographic area. Analogous to a watershed, integrated regional foodsheds use the efficiency of networks and systems design to dramatically reduce the costs associated with processing and transportation while increasing access to affordable, fresh, and healthy food options. http://www.urbaninhlab.columbia.edu/?pid=nyc_foodshed Retrieved 10/14/2009

8 Food miles refers to the distance food is transported from primary production to consumption..."from farm to fork"

9 The food dollar refers to actual consumer spending on food products. It is commonly used to signify the proportion of this spending that a given economic sector (or a firm that is integrated across multiple sectors) captures on average.
1.5.2 Food System Sustainability Goals

Appendix A provides an overarching view of how these goals interact with key objectives, strategies, tools, and institutional indicators for evaluation.

CONTINUAL DEVELOPMENT OF SUSTAINABLE SUPPLY CHAIN MANAGEMENT

**Goal 1:** By 2020, 50%\(^{10}\) of total procurement of food (related) supplies and services will come from sustainable sources as defined by the Sustainable Food Scoring System (SFSS)

Food Procurement: fruits, vegetables and juice; grains, pasta, and cereals; seeds, nuts, and plant oils; fish, poultry and eggs; dairy; red meat; sugar/sweeteners; condiments, herbs & spices, and tea; coffee/chocolate

Materials Procurement: Disposables, linen & uniforms, office supplies, packaging

Services: Maintenance, grease removal, laundry, pest control, etc.

REDUCE/MINIMIZE ADVERSE ENVIRONMENTAL IMPACTS OF FOOD SYSTEM OPERATIONS

**Goal 2:** By 2020, reduce overall use of energy, nonrenewable resources, and industrial inputs arising from food production and consumption activities at least 25% from 2009 levels\(^ {11}\)

Energy Use: Electricity, gas, etc.

Materials Use: Disposables, paper/office supplies, cleaning supplies & chemicals, industrial agriculture inputs (seed, feed, fertilizers, etc.)

**Goal 3:** By 2020, reduce total output to landfill at least 67% below 2009 levels

Greenhouse gas emissions: from combustion/energy use, landfill decay, biological emissions, and fertilizers

Food waste and output to landfill: both pre- and post-consumer

- Recycling: Post-consumer products and fryer oil (rate)
- Composting rate (proportion of food waste)

OPTIMIZE SELF-RELIANCE IN SUSTAINABLY PRODUCED FOOD

**Goal 4:** By 2020, increase the proportion of WWC-produced foods procured by Dining Services to at least 35% of agronomic output* by mean combined weight and revenue, toward eventual parity (50%).

Productivity: Food output per capita, Food output (per acre) per dollar of purchased inputs

Student involvement: Proportion of student work crew positions involved primarily in WWC food systems

Proportion of food production (combined by weight and revenue) procured by Dining Services

CONTINUAL EDUCATION FOR SUSTAINABILITY AWARENESS

**Goal 5:** Integrate WWC food system sustainability initiatives into wider triad of academics, work, and service, as well as student, guest, and staff awareness

ENCOURAGE INTRA- AND INTER-INSTITUTIONAL COLLABORATION

**Goal 6:** Promote synergy with local school districts' and other institutional sustainability goals

**Goal 7:** Provide tours, information, and presentations to NACUFS\(^ {12}\) and industry

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10 Warren Wilson College acknowledges that increasing sustainable procurement entails increased costs. WWC would like to set a goal higher than 50%, but recognizes that these may be prohibitive in some cases, while supply may not exist in others. WWC Dining Services and/or Farm may require additional institutional resources to meet this goal.


* Total food output excluding waste or donated surpluses

12 National Association of College & University Food Services
2. Sustainability in WWC Food Systems—overview

2.1 Current and Upcoming Initiatives

Producing
- 67% of all red meat (beef & pork) served in Gladfelter is produced on WWC Farm
- Grass-fed beef
- College garden provides fresh produce to Dining Services
- Community and Permaculture Gardens
- Garden donates surplus produce to MANNA food bank

Purchasing
- Fair Trade coffee and organic tea in Cow Pie Café
- 100% vegetarian Cow Pie Café
- >90% of apples sourced locally
- Local honey and apple cider
- Produce distributor works with local farmers to increase supply of local foods
- All dining locations are tray-free as of 2009
- Disposable wares limited to unbleached napkins in Cow Pie; reduced usage in Gladfelter
- Use of APEX washing system that monitors energy/water use
- “Clean Plate” program to minimize waste

Consumption: Reducing
- Green Drum composting system
- All dining locations recycle cardboard, paper, aluminum, glass, and plastic via Recycling work crew
- All used fryer grease is recycled

Education
- Work
- Service
- Academics

Collaborating
- Collaboration with Climate Action Plan on energy-conservation/reduction measures.
- Service Learning opportunities with MANNA food bank, Black Mtn. Community Garden, etc.
2.2 Developing Initiatives

- Farm is exploring possibilities for raising pigs in pasture
- Garden is exploring feasibility of flash freezing products for on-campus use

- Use of ASAP mixing bowl program

- Expansion of Green Drum composting system
2.3 Agricultural Production & Marketing Mix
Average total revenue from agricultural activities at WWC from 2006-2008 was $182,356.50 representing over 43,750 lbs of food products. As illustrated in figure 3, this comes from sales of beef ($85,529), pork ($63,477), eggs ($3,000), produce ($23,617), and herbal products ($4,866.67). Of this production (excluding herbal products) $33,294.78 (16,153 lbs) in sales went to Sodexo, while $4,233.33 (1,883 lbs) came from the campus-based CSA, and $139,961.72 (43,574 lbs) came from sales to private individuals.
2.3.1 Farm & Garden Marketing Mix
Agricultural production is derived from two work crews, the Farm and the Garden, whose resource bases and sales statistics differ significantly. From 2006 through 2008, annually the 2½-acre Garden earned $28,483.67 (16% of total revenue) from sales of 13,316.67 lbs (30% of total production) of produce on average. Meanwhile, the 330+ acre Farm generated $149,006.50 (83% of total) from sales of 30,374 lbs (70% of total) of pork, beef, and eggs. These sales were made to a variety of sources, including Sodexo, a CSA, and private transactions, whose proportions are illustrated in figure 3.

![Figure 2: Proportions of total Garden (left) and Farm (right) sales by weight, revenue, and their average, 2006-2008. Herb crew sales are not included in Garden figure. Figure heights correspond approximately with their respective contribution to overall production/revenue](image)

2.3.2 Nonrenewable resource use
The annual WWC Greenhouse Gas Emissions Inventory has begun tracking fuel usage and some fertilizer inputs (with atmospheric emissions). Unfortunately, these measurements do not track those directly attributed to agricultural operations specifically, as some equipment is shared with other work crews. Additionally, not all fertilizers with atmospheric emissions have been included in past inventories (notably lime), while emissions from their extraction and production are also excluded. Furthermore, other (chemical) inputs without direct atmospheric emissions—let alone any emissions associated with their production or procurement by agricultural operations—are not currently being monitored. Therefore, the Campus Food Policy Council should work with agricultural operations to monitor usage (and impacts) of these inputs by agricultural operations at WWC.
2.4 Dining Services Purchasing Patterns
See Appendix B for more purchasing patterns from 2007-8

2.4.1 Food Purchasing
Total food purchasing in 2008-9 was $515,000. This budget is distributed among ten food categories:

2.4.2 Non-food Purchasing
Total non-food materials purchasing in 2009/9 is $36,237. This is distributed among four categories:
2.5 Dining Services Operations

2.5.1 Nonrenewable Resource Use
The Water & Energy Efficiency (WEE) crew will be monitoring electrical use in all kitchens beginning in November 2009, with results expected sometime in the spring of 2010. Natural gas usage for the entire Gladfelter building in the 2007/8 school year was 18,000 therms (1 them = 100,000 BTUs)\(^{13}\), although this may or may not be used exclusively in the kitchens. Water consumption is unable to be quantified at this time, but the WEE crew is working on acquiring a temporary water meter to do it by 2011.

2.5.2 Recycling & Composting
- All Dining locations recycle cardboard, paper, aluminum, glass, and plastic; steel, wood pallets, and other miscellaneous items are also recycled campus-wide, diverting close to 40% of the College’s total waste stream from the landfill.
- Used fryer oil is donated for conversion to biodiesel, but pick-up (Mountain Biofuels) is inconsistent
- Over 31 tons of food waste is composted annually

2.5.3 Education
- Local Foods work crew educates students about Sustainable Dining initiatives
- Materials are provided in dining units about promoting waste reduction.
- Sodexo provides ongoing education and training for all employees (including 53-64 students on work crews) regarding goals, objectives, and sustainability principles of WWC Dining Services

2.5.4 Collaboration
WWC Dining Services works with the following campus departments and groups:
- Sustainable Foods Policy Task Force
- Recycling Crew
- Student Caucus & Staff Forum
- Significant volumes of surplus produce from the garden are donated to MANNA Food Bank

\(^{13}\) 2007-2008 WWC Greenhouse Gas Inventory
3 Sustainability Roadmap: Strategies & tools

3.1 Procurement/Purchasing: GENERAL OBJECTIVES
- Source products whose agricultural production or fisheries management practices ensure socio-ecological sustainability
- Increase tenders from local\textsuperscript{14} producers and suppliers, prioritizing WWC-produced goods whenever possible
- Increase/maximize producer share of “food dollar”
- Increase procurement of minimally-processed and packaged goods
- Find opportunities to preserve and store local produce for use throughout the year
- Review purchasing of non-food materials to maximize congruity with WWC Purchasing Pattern Language
- Prioritize energy-efficiency when purchasing new equipment or revamping facilities operations.

3.1.1 Food Purchasing
Food purchasing guidelines for WWC and its contract service providers on campus will prioritize institutional self-reliance, products whose agricultural or fisheries management practices ensure socio-ecological sustainability of production/capture, local producers and the purveyors that patronize them, and supply channels that shorten the “chain” between production and consumption—effectively maximizing the producer share of the food dollar—and employ minimal processing.

Objectives:
- By 2010 WWC will implement a scoring system designed to measure the degree to which individual food products and overall purchasing patterns meet its minimum sustainability score.
- By 2012 WWC will implement a 2\textsuperscript{nd}-party certification system to certify a small number of very local farms that are unable to utilize 3\textsuperscript{rd}-party certification schemes
- By 2020, 40% of WWC Dining Services food purchases will meet or exceed this sustainability standard and at least 50% of all WWC food purchases (includes Sage Café, Campus Bookstore, etc.) will meet or exceed this standard

General Purchasing Guidelines
The Circular Food Logic model and key sustainability indicators for sustainable farming and food systems (Appendix D) depicts the basic framework and approach to guiding sustainable food purchasing decisions. Fundamentally, this policy is an attempt to develop this model in far greater detail with respect to the unique circumstances in existence at Warren Wilson College at present. Future issues that may arise due to unforeseen causes should return to this pattern language for guidance.

3.1.1.1 Sustainability Scoring System
In terms of purchasing and supply chain management, we use an integrative, goal-oriented definition of sustainable food as that which a) ensures socio-ecological sustainability of its agricultural production or fisheries stability, b) minimizes and supports local/regional economies, c) maximizes the producer share of the food dollar, and d) optimizes institutional self-reliance. These objectives have been developed into a scoring system that can be applied to food products across the board. In this system, a given product is given three scores based on the degree to which each objective is met in table 1. Table 2 identifies food products that meet a minimum sustainability score (5) based on the three variables in this scoring system.

\textsuperscript{14} Local refers to the area covered by the Appalachian Sustainable Agriculture Project (ASAP) Appalachian Grown\textsuperscript{TM} label
Table 1: Links between objectives and scoring factors

<table>
<thead>
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<th>Sustainability Objectives</th>
<th>Sustainability Indicators</th>
<th>Scoring Factor</th>
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<tr>
<td>Optimize institutional self-reliance</td>
<td>Verifiable product certifications (agricultural)(^{15})</td>
<td>Production sustainability score (PS)</td>
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<td>Support local/regional economy</td>
<td>Monterrey Bay Aquarium recommendations (seafood)</td>
<td>Geography of producer (FM)</td>
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<td>Ensure socio-ecological sustainability of agriculture production and fisheries management</td>
<td>Proximity of grower, packager, processor, and distributor(s)</td>
<td>Supply Chain modifier (SC(^{M})) score</td>
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<td>Reduce/minimize “food miles” &amp; support local/regional economy</td>
<td>Directness of supply chain</td>
<td>WWC is “zero-order” procurement mode</td>
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<td>Increase/maximize producer share of “food dollar”</td>
<td>Number and availability of WWC farm products</td>
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<td>Optimize institutional self-reliance</td>
<td>Food System-related proportion of Work Program</td>
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Table 2: Sustainable Purchasing—highlighted cells indicate Sustainable at minimum standard of 5

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<td>1.59</td>
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Eastern North America and Caribbean (FM=1)

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<td>1.91</td>
<td>1.91</td>
<td>1.59</td>
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Rest of N. America & Northern S. America (FM=0)

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<th>Quaternary</th>
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<td>1.90</td>
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<td>1.72</td>
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<td>4.00</td>
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<td>1.27</td>
<td>0.95</td>
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Global (FM = -1)

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<td>3.44</td>
<td>2.58</td>
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<td>3.20</td>
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<td>2.07</td>
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</tr>
<tr>
<td>1.32</td>
<td>1.27</td>
<td>0.64</td>
<td>0.00</td>
</tr>
</tbody>
</table>

\(^{15}\) Refers primarily to verifiable 3rd-party certifications, conducted by an agency independent of producer and consumer.
3.1.1.1 Sustainability standards of agricultural production and fisheries management

Agricultural Products
Examining food and agriculture through the lens of sustainability reveals a complex web of interrelated issues. A partial list includes labor issues, animal welfare, hormones and non-therapeutic antibiotics, genetic modification of crops and livestock, toxicity, water conservation and quality, soil conservation and health, global warming, protection of wildlife, local economies, and food quality & safety.

Detailed definitions have been elaborated for the production side of sustainable food systems, where sustainable agriculture and fisheries management are clearly implicated. First, sustainable agriculture was defined in the 1990 farm bill as “an integrated system of plant and animal production practices having a site-specific application that will, over the long term, satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agricultural economy depends; make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole.”

Examining food and agriculture through the lens of sustainability reveals a complex web of interrelated issues. A partial list includes:

- **Labor issues** – Agriculture and food processing are among the most difficult, most dangerous, and lowest paid occupations in the US.
- **Animal welfare** – Improper confinement and handling of animals can cause stress, pain, injuries and chronic disease, all contributing to animal mortality.
- **Hormones and non-therapeutic antibiotics** – Used to promote animal growth and productivity, these treatments can result in antibiotic resistant bacteria and other human health concerns.
- **Genetic modification of crops and livestock** – With limited long-term testing of GMOs, the precautionary principle raises concerns for potential human health and environmental impacts.
- **Water conservation and quality** – Agriculture represents 84% of freshwater used in the US. Environmental Protection Agency studies also identify agriculture as the leading source of ground and surface water contamination.
- **Soil conservation and health** – Tillage, wind and water erosion, and use of soil fumigants and other chemicals all contribute to depletion of soils.
- **Global warming** – Agriculture is a known source of nitrogen from soil degradation, methane from animal waste, ozone-depleting chemicals, carbon dioxide from farm equipment and transportation, and additional energy is used for food processing, packaging and refrigeration.
- **Protection of wildlife** – Ninety percent of threatened species in the US are known to spend some portion of their life cycle on privately owned agricultural lands.
- **Local economies** – Family-scale agriculture and food processing are under significant economic pressure due to consolidation in industry, and increasingly international trade.
- **Food quality and safety** – Concerns have been raised for pesticides, herbicides, and fungicides as well as food additives used to extend shelf-life or enhance color and flavor, for contaminants, and for food-borne illnesses like e-coli.

Returning to the triple bottom-line model of sustainability, these can be clustered into their economic, social/cultural, and environmental dimensions (see Appendix D). Employing these as criteria, the degree to which particular indicators of sustainable food production/capture ensure progress toward all three objectives simultaneously can be estimated using Multi-Criteria Analysis (MCA), reflecting institutional capabilities and existing verification programs.

Table E1 in Appendix E chronicles the specific sustainability indicators that particular 3rd-party certifications for agricultural products address. Each

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16 USDA. Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA), Public Law 101-624, Title XVI, Subtitle A, Section 1603


18 Verification scheme in which production activities are inspected by a company independent of producer or distributor. The 3rd-party certification company confirms the legitimacy of claims made by food producers and distributors, thus ensuring that the food labels are meaningful. For an overview of common labels, see [http://www.greenerchoices.org/eco-labels/](http://www.greenerchoices.org/eco-labels/)
indicator is then awarded up to three scores for each of the ‘pillars’ of sustainability addressed by a
given certification, based on the number of issues each monitors, and the extent to which they are
addressed. Scores for each factor (Environmental, Social/Cultural, Economic) are the number of
potentially adverse impacts of production and supply the certification ensures are avoided/averted.

Seafood
Sustainable seafood has been defined by the Monterey Bay Aquarium as “[aquatic food species] from
sources, whether fished or farmed, that can exist into the long-term without compromising species’
survival or the integrity of the surrounding ecosystem.”\textsuperscript{19} These guidelines address capture methods and
fishery-specific issues, so a given species may appear on multiple lists, based on where and how they are
being caught. Additionally, a handful of 3rd-party certifications exist that address some adverse secondary
impacts from fishing methods and seafood consumption. Together, these indicators address the full
scope of factors that effectively determine sustainability of fisheries management (equivalent to
agricultural production), depicted in table 3. The combined score of these indicators comprise the PS(F)
score for a given product. See Appendix F for current seafood guidelines in a geographic context.

Table 3: Fish & Seafood Production Sustainability Scoring

<table>
<thead>
<tr>
<th>PSS</th>
<th>Monterey Bay Seafood Watch lists</th>
<th>3rd-party certifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>“Best Choice” list</td>
<td>Marine Stewardship Council (MSC)™</td>
</tr>
<tr>
<td>1</td>
<td>“Good Alternatives” list</td>
<td>Dolphin-safe™/Friendly™ (Tuna)</td>
</tr>
<tr>
<td>-1</td>
<td>Seafood Watch “Avoid” list</td>
<td>3rd-party contaminant-free labels (various)</td>
</tr>
</tbody>
</table>

3.1.1.1.2 Food Miles
This factor circumscribes a variety of issues ranging from greenhouse gas emissions from transport to
food security and local food culture. Unfortunately, it is next to impossible to calculate a precise number
of miles (each ingredient in) a given food product has traveled from the farm(s) and fisheries they were
produced on through various processing and distribution channels to Warren Wilson College. Instead, a
geographic hierarchy (table 4) is used to prioritize purchasing from sources close to home. It should in
no way be interpreted that this scoring hierarchy is an exact measurement tool for determining fossil fuel
emissions or arising from transport. It merely indicates the relative distance a food has traveled from its
supplier (which may or may not be an actual farm) to WWC. Even WWC beef travels hundreds of
miles going to the butcher and back despite its status in this scoring hierarchy as “local, <50 miles.”
However, it is safe to assume that the closest possible processing facilities are being utilized in these cases,
making the score useful as an indicator of food miles associated with at least one link in the supply chain.
Thus a third variable, the Supply Chain (SC) score (discussed below) is needed to account for increasing
uncertainty associated with lengthened supply chains from producer to supplier.

This Food Miles (FM) score is derived from concentric circular geographic zones, the area of
each is greater than the zones within by a factor of 10. The radius of this zone (with area = 10x)
represents the average distance food travels from supplier to WWCC, and the maximum and minimum
radii are set at $10^{1.5}$ and $10^{-0.5}$, respectively. The exponent is adjusted to reflect the smallest practical
zone and a decreasing scoring system (decreased score as exponent increases). Again, this score can be
conceptualized as orders of magnitude fewer food miles. Figure G1 (Appendix G) illustrates this scoring
hierarchy geographically and includes country breakdown and a map of the Appalachian Sustainable
Agriculture Project (ASAP) Appalachian Grown™ region.

### Table 4: Food Miles Scoring Hierarchy

<table>
<thead>
<tr>
<th>FM Score</th>
<th>10 to the equals</th>
<th>(avg) radius</th>
<th>Double area (adj)</th>
<th>(max) radius</th>
<th>rounded</th>
<th>Buncombe County</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>316</td>
<td>10</td>
<td>632</td>
<td>14</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>3.5</td>
<td>3,162</td>
<td>32</td>
<td>6,957</td>
<td>47</td>
<td>50</td>
<td>4 Adjacent counties</td>
</tr>
<tr>
<td>4.5</td>
<td>31,623</td>
<td>100</td>
<td>70,203</td>
<td>150</td>
<td>150</td>
<td>3 Appalachian Grown</td>
</tr>
<tr>
<td>5.5</td>
<td>316,228</td>
<td>317</td>
<td>702,658</td>
<td>473</td>
<td>500</td>
<td>2 SE USA (Includes Florida, E North America and Caribbean)</td>
</tr>
<tr>
<td>6.5</td>
<td>3,162,278</td>
<td>1,004</td>
<td>7,027,213</td>
<td>1,496</td>
<td>1500</td>
<td>1 Rest of N. America, NW S.</td>
</tr>
<tr>
<td>7.5</td>
<td>31,622,777</td>
<td>3,173</td>
<td>63,245,553</td>
<td>4,488</td>
<td>4000</td>
<td>0 America and N. Atlantic</td>
</tr>
</tbody>
</table>

### 3.1.1.3 Supply Chain

Supply chains (i.e. the flow of goods from farm to plate, and the contractual arrangements which support this) can vary greatly in their complexity. Strictly in term of the flow of goods, supply chains can be very complex or quite direct, with any of the routes or components depicted in Appendix H. There is a trend towards centralization in this process. Economies of scale and simplicity for the buyer have meant that one-stop food service companies are now dominating the market. As buying consortia become more common, and efficiencies and value for money more important, this trend may increase further. In parallel, competition from world markets has pushed commodity prices down. The result is a steady erosion of the business viability of smaller suppliers and processors. See Appendix J for more in-depth discussion of sector- and product-specific supply chain issues and action areas.

### Table 5: Procurement Mode Categories and SC scores

<table>
<thead>
<tr>
<th>Procurement Mode (order)</th>
<th>Description</th>
<th>Avg. % of food dollar</th>
<th>Adjusted Log, Supply Chain (SC) Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero-order</td>
<td>Self sufficiency in practice. Procurement from College Farm, Garden, or Forest crews.</td>
<td>150’</td>
<td>3.81 4</td>
</tr>
<tr>
<td>Primary</td>
<td>Procurement directly from primary producer (farm) or farmers' cooperative. The product, or all of its ingredients are produced by the supplier(s) and any processing activities are directed by the supplier(s). Close to 100% of the “food dollar” for these products makes it to the producer(s).</td>
<td>75</td>
<td>3.12 3</td>
</tr>
<tr>
<td>Secondary</td>
<td>Procurement of products that the supplier procured directly from a farm or farmers' cooperative. On average, 50% of the “food dollar” for this type of procurement makes it to the producer(s), and the entire supply chain is simplified. The supplier knows where (and often how) the food was produced.</td>
<td>30</td>
<td>2.20 2</td>
</tr>
<tr>
<td>Tertiary</td>
<td>A secondary product comprised of at least some primary products (those purchased via primary procurement mode) or unprocessed, whole foods.</td>
<td>12</td>
<td>1.10 1</td>
</tr>
<tr>
<td>Quaternary</td>
<td>Products comprised entirely of secondary (or post-secondary) products. Generally, less than 10% of the “food dollar” makes it to the producer in this mode.</td>
<td>4</td>
<td>0.19 0</td>
</tr>
</tbody>
</table>

Each of these procurement modes are explained in detail in table 5, ascribing a Supply Chain (SC) score

* Set artificially high to prioritize WWC; reflects the increased consumer satisfaction associated with WWC-produced foods served by Dining Services
to each based on the natural log of the average share of the food dollar the producer receives\textsuperscript{20}. This will vary depending on product type, so the mean is used. If a product contains a mix of products from more than one food miles zone, an average of the zones' scores should be used, weighting them based on the proportion of ingredients from each, although this would only apply to products grown and supplied in the southeast or closer, with some 3\textsuperscript{rd}-party certification. Within the Sustainable Food Scoring System (SFSS), this score again represents orders of magnitude of improvement toward Sustainable Food Policy objectives, reflecting exponentially increasing costs, lower nutritional quality, decreased food security, and overall uncertainty associated with longer supply chains. As such, this score is transformed from the natural logarithm to that of base 10 in the final scoring method to account for these, multiple, sustainability objectives.

### 3.1.1.4 Sustainable Food Examples

**Agricultural Products:** See table 2 (p. 15) for a full list of sustainable food combinations and Appendix I for a more general overview based on arbitrary Production Sustainability (PS) scores.

#### Table 6: Sustainable Fish &Seafood Examples

<table>
<thead>
<tr>
<th>Example:</th>
<th>PSS (F)</th>
<th>FM</th>
<th>SC\textsuperscript{M}</th>
<th>S (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainbow trout from Sunburst Trout Co., Canton, NC</td>
<td>3 (Best choice)</td>
<td>4 (local)</td>
<td>1.5 (1\textdegree procurement mode)</td>
<td>8.13</td>
</tr>
<tr>
<td>Shrimp from Bubba Gump Shrimp Co., Charleston, SC</td>
<td>4 (Good alternative, MSC certified)</td>
<td>2 (SE USA)</td>
<td>1 (2\textdegree procurement mode)</td>
<td>7.33</td>
</tr>
<tr>
<td>Dolphin-safe Albacore Tuna from American Tuna Company</td>
<td>4 (Best choice, Dolphin safe)</td>
<td>1 (E N. Am.)</td>
<td>0.5 (3\textdegree procurement mode)</td>
<td>4.80*</td>
</tr>
</tbody>
</table>

* Sustainable only with rounding

### 3.1.1.2 Dining Services purchasing objectives for food categories

**Produce and Juice**

Current State: In the 2008-9 school year, 13% of produce and juice purchasing can be considered sustainable, whereas 25% of annual produce and juice purchasing came from local/regional sources (<20% adjusted for supply chain issues). Just over 8% of produce purchasing comes from the College.

Objective: By 2020, 40% of fresh produce and juice will meet or exceed minimum standards for sustainable food, and 30%, it is hoped will come from local sources.

**Meat & Eggs**

Current State: In the 2008/9 school year, just under 33% of all meat and eggs purchasing meets the minimum requirements to be considered sustainable.

Objective: By 2020, 75% of animal protein product purchasing will meet or exceed minimum standards for sustainable food (SFSS). It is feasible that most of this could come from the College.

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\textsuperscript{20} From Apaiah et al, Quantitative Method for efficient food chain design Trends in Food Science & Technology 16(2005) 204-215
**Dairy**
Current State: In the 2008/9 school year, less than 1% of dairy purchasing meets the minimum requirements to be considered sustainable. Local supply is fairly good, with a local company (MilkCo.) that could supply DS. It is about 100% local 85% of the time which translates to 77% of school yr.
Objective: By 2020, at least 42% of dairy products—particularly milk, butter, and cream—will meet or exceed minimum standards for sustainable food (SFSS).

**Grains, pasta, and cereals**
Current State: In the 2008/9 school year, less than 1% of grains, pasta, and cereals purchasing meets the minimum requirements to be considered sustainable.
Objective: By 2020, at least 10% of grains, pasta, and cereals purchasing will meet or exceed minimum standards for sustainable food. Corn flour and grits are available in adequate quantities locally to do this.

**Seeds, nuts, legumes, and plant oils**
Current State: In the 2008/9 school year, approximately 3.5% of purchases of these products meet minimum requirements to be considered sustainable (SFSS).
Objective: By 2020, at least 10% of these products purchased by dining services will meet or exceed minimum standards for sustainable food.

**Sugar & Sweeteners**
Current State: In the 2008/9 school year, just under 18% of sugar/sweetener purchases (predominantly local honey) meet minimum requirements to be considered sustainable.
Objective: By 2020, at least 33% of sugar/sweeteners purchased by dining services will meet or exceed minimum standards for sustainable food. Locally, sorghum syrup can be obtained in large quantities, and would be the local version of advance, as most honey is already sourced locally.

**Condiments, herbs, spices, & tea**
Current State: In the 2008/9 school year, approximately 1.5% of purchases of these products meet minimum requirements to be considered sustainable.
Objective: By 2020, at least 10% of purchases of these products by dining services will meet or exceed minimum standards for sustainable food.

**Coffee & Chocolate**
Current State: In the 2008/9 school year, less than 10% of coffee/chocolate purchasing by dining services meet minimum requirements to be considered sustainable. 50% of coffee procured by Dining Services is fair trade, but the proportion qualifying as “sustainable” varies significantly from year to year, depending on the locations of origin. Also, all coffee purchasing by the WWC Bookstore and Sage Café is Fair Trade.
Objective: By 2020, at least 50% of coffee/chocolate purchasing will meet or exceed minimum standards for sustainable food.
3.1.2 Non-food materials purchasing

Equipment, Materials & Supplies
Non-food purchasing decisions should be made in accordance with WWC Purchasing Pattern Language (2001). These guidelines stipulate that purchasing should be conducted with suppliers that guarantee freedom from unfair discrimination, employee health & safety, and a living wage. Furthermore, supplies should be purchased on the basis of least-impact on the biosphere, prioritizing energy efficiency, ease of recycling, minimal packaging, and/or minimal environmental impact, as applicable. All purchasing of equipment should be Energy Star certified. Additional purchasing objectives are outlined in the WWC CAP.

3.2 Production & Self-Reliance

In our unique institutional context, the availability of WWC-produced foods can supersede regular purchasing decisions, implicating the College’s agricultural production systems as part of the larger campus food system. Thus, institutional sustainability in food systems also requires consideration of a variety of production issues including the size of campus population relative to the productive capacity of WWC working lands, as well as the level of student involvement (via work crews, educational activities, special events, etc.) in internal food systems. Appendix L shows some historic trends in this light.

As illustrated in section 2.3, 18.8% of the revenue from the College’s agricultural operations comes from sales to Dining Services (Sodexo), representing 36.9% (by weight) of total agricultural production, resulting in a combined (mean) of 27.8%. From a production perspective, increasing this combined proportion (by weight and revenue) can be achieved through increasing the combination of three factors:
1. Proportion of existing agricultural production (lbs) sold to Dining Services
2. Avg. prices paid by Dining Services for WWC-produced foods (and total budget)
3. Total production (by weight and revenue)

Addressing the aforementioned factors may necessitate closer scrutiny of production systems and marketing mixes, emphasizing institutional self-reliance, though this should not imply there is an inherent trade-off between them. At least one study\(^\text{21}\) has addressed some of these issues. It is important to recognize that at present, it is not possible to redirect more than 10% of current food production (lbs) from private sales to Sodexo as it cannot use much more red meat products (the primary source of revenue from food production), egg production is insignificant, and garden output is already balanced equally between Sodexo and other sales. Also, in the short-term (<10 years), it is unrealistic to expect Sodexo to increase the prices it pays for WWC-produced foods by more than 25% (amounting to just under a 4% increase in its food budget at current purchasing levels\(^\text{22}\)). Finally, it is unrealistic to expect agricultural production to increase by more than 10% in this time span without resorting to unsustainable means. Therefore, to achieve the overarching goal of 35% (combined $-lbs), total agricultural output will have to increase. This will entail a serious effort to explore opportunities to expand sustainable agricultural production through appropriate capital investment (such as processing equipment/facilities), by supplanting extensive agricultural production systems with more intensive systems arising from increased labor inputs and creative uses of/investment in natural capital or, as unlikely as it may be, through the acquisition of additional farmland.


\(^{22}\) From 2007-8 Food Audit, prepared by the Local Food Crew
General Objective: Identify, develop, and implement least-cost measures to increase sustainable productive capacity of WWC working lands and food system facilities, with emphasis on programs that:

- Are cost-effective, displacing the greatest quantity of unsustainable food procurement by Dining Services while enhancing overall farm profitability, environmental stewardship, and community prosperity.
- Produce products that are unavailable or cost-prohibitive from local/regional sources in quantity & quality that is useful to Dining Services operations
- Engage and support the local farming community, particularly in the Swannanoa Valley.

3.3 Reducing

General Objectives:
- Work with WWC Facilities to increase reporting and monitoring capability for building systems and equipment performance
- Utilize industry best practices, WWC CAP objectives and purchasing pattern language to reduce energy use and waste/fossil fuel emissions in kitchens and improve efficiency.

Energy:
- By 2013, reduce energy consumption by 20% from 2007/8 levels
- By 2020, reduce energy consumption by 80% from 2007/8 levels

3.4 Recycling

General Objective: Continually increase recycling rate

Recycling
- Increase recycling rate to 67% by 2015
- Ensure proper recycling containers are easily accessible in all kitchens, dining halls, and other food service locations
- Ensure 100% of fryer oil is consistently recycled

Composting
- Decrease export of food waste through composting food waste through expansion of the ’Green Drum’ program
- Consider increasing the College’s future food composting capability

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23 Goals derived from WWC Climate Action Plan
24 Informed by WWC CAP & food waste/composting data from 2008 Greenhouse Gas Inventory
3.5 Education

General Objectives:
- Continue to encourage students to champion best practices on their work crews; through their direct action, proposals have been written throughout the years that have established the vegetarian Cowpie Café, the green standards for the EcoDorm, the Recycling Program, the EcoTeam outreach program, the EcoDorm’s permaculture, the Green Drum Composter, Real-Time Monitoring, and many other best practices
- Encourage the “Clean Your Plate” program to minimize waste
- Make dining halls central points for recycling and sustainability information
- Train new work crews and employees in sustainability initiatives at on-boarding
- Use field trips to local farms to connect students with farmers who supply food to WWC
- Integrate local and sustainable food system topics into appropriate academic courses and curricula
- Encourage independent research on WWC food systems from multiple academic perspectives
- Strive to develop models and materials useful to other institutions while recognizing the unique institutional capabilities of WWC

3.6 Collaboration

General Objectives:
- Continue to foster collaboration among WWC Dining Services, Farm, Garden, and Forestry crews to source foods and develop institutional self-reliance
- Continue to provide information and collaborate on regional initiatives to promote, enhance, and sustain agriculture in (western) North Carolina.
- Continue to work collaboratively on student-led initiatives
- Explore opportunities for collaboration and cooperation among nearby private institutions with food production and/or catering operations
- Work to generate synergy with local food initiatives (ASAP's Farm to School, etc.).

4. Evaluation & Monitoring

4.1 Evaluation

Appendix K presents the matrix for evaluating progress toward sustainability in WWC food systems. This evaluation plan has been developed to provide a means for evaluating the effectiveness of the WWC Food System Sustainability Plan. Implementation of the policy will be the responsibility of the Campus Food Policy Council and the Local Food Crew. The Campus Food Policy Council will represent the college community, relevant administrators and some food system participants (farmers, distributors, local food advocates) from the region. The Campus Food Policy Council will have the responsibility to review Local Food Crew reports, evaluate food system performance and revise the Sustainable Food Policy as needed.
4.1.1 Procurement

The Local Food Crew will assist in sustainable food procurement, collect food system data necessary to evaluate food system performance and report on the food system to the campus community as directed by their supervisor. The crew will monitor food purchases and conduct the research needed to provide an annual report to the Campus Food Policy Council on the status of the following indicators (derived from those outlined in Appendix C) as a means to assess the sustainability of production, supply/procurement, and consumption/catering operations in the College’s food system:

- Percentage of employees receiving education or training relevant to the new policy
- Percentages of purchases of specified products or categories that meet purchasing criteria
- Percentage of food budget spent on 3rd-party certified products
- Total miles traveled from farm to WWC of selected food groups
- Total dollars spent in direct sales (primary procurement mode) to farmers/farmer cooperatives
- Geographic proximity of grower, packager, processor, and retailer for selected food groups: FMSC
- Pounds of food/packaging waste produced in Gladfelter and Cowpie
- % of food lost due to spoilage and mishandling
- Ratio of local (Appalachian Grown™ or closer) vs. non-local food sources
- Campus budget on food products
- Affordability of local food
- Proportion of work program directly involved in food systems
- Students attitude towards variety, seasonality, and price

4.1.2 Production

- Productive capacity of Warren Wilson College working lands relative to campus resident pop.
- Proportion of work program directly involved in food systems
- Nonrenewable resource use ($, kJ)
- Sales/costs of purchased inputs excluding labor (fuel, fertilizer, etc.)
- Proportion of agricultural surpluses

4.1.3 Consumption

- Pounds of food/packaging waste produced in Gladfelter and Cowpie
- % of food lost due to spoilage and mishandling
- Total output to landfill (lbs.) and proportion diverted to compost
- Nonrenewable resource use ($, therms)
4.2 Monitoring

4.2.1 Local Food Crew
1. The Local Food crew will be responsible for tracking production and purchasing data by completing an annual Food Audit and to provide bi-annual reports to the Local Food Crew Supervisor on food system performance regarding purchasing criteria and annual reports to the Agricultural Production Administrator* regarding production criteria. The annual Food Audit will serve mainly to record and monitor purchasing of food products that meet minimum sustainability standards as defined by the Sustainable Food Scoring System. All food products with 3rd-party certifications, whole foods with known local/regional origins, and foods sourced directly (from the producer) will be compiled. By 2020, food purchasing should be monitored for all campus operations that regularly purchase food products for resale (e.g. Campus Bookstore, Sage Café, etc.).
2. The Local Food Crew will assess and report on food system compliance to the Campus Food Policy Council
3. This crew will document lessons learned and develop media for release to the campus community and interested institutions. It will also develop avenues to solicit ideas/opportunities from the College to further progress toward fulfilling this policy and its goals.

4.2.2 Campus Food Policy Council
1. The Campus Food Policy Council (CFPC) will be responsible for conducting reviews, together with the Local Food Crew, Food Service Manager, and Agricultural Production Administrator on food system compliance on a semi-annual basis. Full review of food service performance will be coordinated with the food service contract cycle. Other factors to be considered include costs, infrastructure needs, availability of desired foods, or other barriers.
2. Any adjustments to this institutional policy and its goals will be made by consensus of the Campus Food Policy Council after providing an opportunity for review and comment by the campus community

4.2.3 Administrative Council
The Administrative Council will have final authority on any changes to the policy or goals.

* Dean of Work (currently) oversees all work crews involved in food production and their managers.
5. Communication Plan
See Appendix M for the full Communication Plan matrix

5.1 Stakeholders

Primary Stakeholders:
- Students on a meal plan
- Other students, faculty, staff, and visitors who eat on campus
- Dining Services management, staff, and work crews (includes Local Food Crew)
- Agricultural Production management and work crews
- WWC President
- Administrative Council
- Campus Food Policy Council
- Sodexo
- WWC Trustees

Secondary Stakeholders:
- Local food businesses
- Local farms
- MANNA food bank (the major benefactor of surplus produce)

Tertiary Stakeholders:
- Campus and local Media (Echo, Citizen-Times, etc.)
- ENS Department
- Community Based Organizations (e.g. ASAP)

5.2 Communication Objectives

5.3 Strategies

5.4 Potential issues & risks
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**Figure 3**: 2007-8 Dining Service food purchasing by food groups & WWC provision
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**Table 1**: Links between policy objectives and scoring factors
**Table 2**: Sustainable Agricultural Products (minimum score/standard of 5)
**Table 3**: Fish & Seafood Production Sustainability Scoring
**Table 4**: Food Miles Scoring Hierarchy
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