



RUTGERS

School of Environmental
and Biological Sciences



5 Year Strategic Plan

**Rutgers, The State University of New Jersey
School of Environmental and Biological Sciences
Strategic Plan 2020-2025**

“A Call to Action”

I. Preamble: This Strategic Plan of the Rutgers University School of Environmental and Biological Sciences (SEBS) is a call to action. We are living in the “Anthropocene,” a geological epoch in which human activity is a dominant influence upon the Earth’s environment and climate. With this reality come existential challenges, including climate change, mass extinction, biological and resource depletion, food and water insecurity, human population growth, and the recognition that the wellbeing of all living things – as individuals and as species – is interdependent and essential to the long-term health of our planet.

Developing solutions for such major challenges requires innovative scholarship, transformative and experiential education, and a commitment to public outreach and engagement to ensure a robust and thriving future not only for humans, but for all of Earth’s inhabitants.

SEBS is uniquely configured and positioned to lead the efforts at Rutgers University to address these challenges.

This Strategic Plan is developed by the SEBS community – its faculty, students, staff, and alumni – in a moment of transition in leadership within our School and the University. The Plan builds on the strengths of our traditions in research, teaching, outreach, and engagement. It outlines our strategic ambitions that will help the faculty, as well as the new leadership of SEBS and Rutgers in the spirit of shared governance, to prioritize and shape our contributions to the success of the University as a leading, Tier 1 research and education institution.

This report is a contribution to the university-wide strategic discussion on academic unit organization (see report of the Committee on Academic Unit Organization: <https://universitystrategy.rutgers.edu/>), and is based on a thorough self-study conducted by SEBS in 2017 (see: <https://issuu.com/rutgers84/docs/external-review-2017?e=33727543/70518638>) and an external review of SEBS conducted in 2018.

The Plan also provides our current and prospective students with our sense of purpose and our aspirations for their educational journeys; it emphasizes for our staff, who are essential to our success, our shared purpose and their contribution; it provides New Jersey residents and our partners in the agricultural, environmental, and business sectors with a promise to continue our land-grant mission to support their health, productivity, and sustainability; and it provides our alumni with a vision of our future of which they can be proud.

It is within this context that we put forth this Call to Action.

II. Who we are: Our School’s roots are in the original New Jersey Land-Grant College – the Rutgers Scientific School—established in 1864.¹ SEBS is directly affiliated with the New Jersey Agricultural Experiment Station (NJAES)—established in 1880—and its associated extension unit, Rutgers Cooperative Extension (RCE)—established in 1914. NJAES and RCE were created to conduct and transmit research relevant to the needs of the residents of New Jersey – to increase their wellbeing, and to protect and sustain the state’s biodiversity and natural resources.

This strong SEBS-NJAES relationship positions the School to build on its history of groundbreaking scholarship leading to transformational changes. Our 140-year legacy includes:

- A Nobel Prize for the development of a systematic approach to find antibiotics culminating in the discovery of streptomycin.
- The practical application of artificial insemination for farm animals.
- Intervention and prevention strategies to reduce disease transmitted through insects and ticks.
- Development of new breeds of ornamental plants, oysters, turf, trees, and agricultural crops, including the world-renowned Rutgers tomato.
- Innovation of the first air-inflated, double-layer polyethylene greenhouse.
- Advancement of sustainable and resilient forests and fisheries, and statewide support of wildlife conservation, land use, and water resource planning.
- Undergraduate student led navigation of the first undersea robot across an ocean basin in history, an accomplishment that was honored by the Smithsonian Institute and the White House.

SEBS-NJAES continues to successfully serve the increasingly diverse population of New Jersey by integrating basic and applied research with education, outreach, and engagement to achieve outcomes such as bolstering commercial agriculture; promoting local food production; advancing food engineering and safety; enhancing health and wellness through nutrition, physical activity, and social programs; innovating residential horticulture; supporting youth development and community-based family wellness; assisting in the development of small businesses; and advising local, state and federal government, industry, and individuals, including low-income families and children.

Our legacy is also embedded in our commitment to teaching and professional education. SEBS currently serves more than 3400 undergraduate students, and over 300 graduate students and post-doctoral trainees. Students are able to pursue 21 undergraduate majors, more than 30 minors and certificates, and a wide variety of master’s and doctoral degrees within 12 graduate programs, as well as experiential and study abroad opportunities. Several SEBS programs, accredited by national organizations, prepare students for the workforce and professional certification. All these efforts are sustained by dedicated staff who advance the vision and mission of the School through their research, support activities, and administrative and financial duties. The success of the school is further supported through shared leadership by faculty through the SEBS Department Chairs Council.

¹ For full historical context, go to https://catalogs.rutgers.edu/generated/nb-ug_current/pg720.html

Today, New Jersey and its diverse population are on the frontlines of the challenges presented by the Anthropocene. It is the goal of this Strategic Plan to outline how we will prepare for and meet these challenges.

III. Core Areas of Research and Education: The specific strengths of SEBS are focused on five core areas:

Agriculture, Food Systems, and Society - SEBS historic land-grant legacy provides a strong platform to teach entrepreneurial and innovative education in the agricultural sciences and explore sustainable agricultural systems. Its focus on agriculture as well as food policy and management encompasses agricultural economics, pest management, improving the welfare of farm families, addressing the societal impacts of new food technologies, human and animal nutrition, food insecurity, and food safety, processing and engineering. Programs in plant biology and genetics use traditional breeding as well as molecular tools to improve genetic traits and combat disease. Through courses, research, and outreach activities, SEBS explores the capacity of local food production and food systems that connect urban and suburban communities with agriculture and open space to enhance the economy, landscape, and culture of New Jersey.

Climate and Earth Systems - SEBS is a global leader in understanding Earth's environment, spanning the land, ocean, and atmosphere. Understanding the processes and systems critical to fostering and sustaining life on earth is a core focus. SEBS combines observation technologies, numerical models, and experimental work to understand and predict how Earth's environment has changed over time and will change in the future, with a growing focus on the increasing impacts of human activity (e.g. climate change, urbanization, overexploitation, pollution) from local to global scales. SEBS strongly contributes to the multidisciplinary and interdisciplinary development of strategies for mitigation and adaptation to climate change through both social and environmental approaches.

Ecosystems - SEBS is at the forefront of understanding the complex network of interconnected organisms and their interactions with their physical environments, employing an interdisciplinary approach that reaches from biochemistry to global biodiversity, and from microbes to whales. SEBS research on the evolution of ecosystems includes the biochemistry and ecology of microbiomes, plant-insect-animal interactions, ecological impacts of invasive species, degradation of anthropogenic pollutants, ecosystem conservation, and characterization of changes across ecological systems on a warming planet. In addition, SEBS biological research collections of marine organisms, insects, plants and microbes are rich sources of historical and contemporary information on a changing biodiversity of endangered species and invasive newcomers.

Sustainable Health & Wellbeing - SEBS research spans the molecular and physiological underpinnings of health to the influences of food, diet, and active lifestyle on chronic diseases. Such research is informed by the concept of *One Health*, defined by the U.S. Centers for Disease Control and Prevention (CDC), which focuses on the interconnections between the health and wellbeing of humans, animals, and ecosystems. With more than half of infectious diseases in people being transmitted by animals, including insects, an understanding of animal health is fundamental to human health. SEBS research also focuses on reduction in the nuisance and health risks of insects and ticks, the humane treatment of animals, and the preservation and safety of our food, water, and air. SEBS expands the concept of sustainability to include

strategies to promote health and wellness, as well as ethical and just economic and social welfare for youth, families and underserved communities throughout the world.

Human-Environment Engagement - SEBS has an established international reputation for understanding and addressing how humans change the environment, and how environmental changes impact individuals, communities, cultures, societies, and the planet. In particular, SEBS expertise addresses the challenges of a rapidly warming and urbanizing world. Linking the natural sciences, social sciences, policy, and economics with design and planning yields creative and innovative strategies to enhance the ecological value of urban, suburban, rural, and undeveloped environments, and to protect and guide their sustainable use. SEBS faculty research areas include participatory design and planning, urban parks and open space, urban ecological design, wetland ecology and management, sustainable agriculture, forestry and fisheries, energy and water use, climate mitigation and adaptation, and environmental governance, as well as science, health, risk, and environmental communication, engagement, and outreach.

Connecting these core areas, SEBS uses a holistic model, recognizing that understanding and finding solutions for our challenges depends on the convergence of ideas and evidence from multiple and diverse disciplines. The concept is visually represented in **Figure 1** in which the consilience themes of ‘Environment,’ ‘Sustainability,’ ‘Wellness,’ and ‘Ethics, Social Justice, and Governance’ run through and unite the core areas.

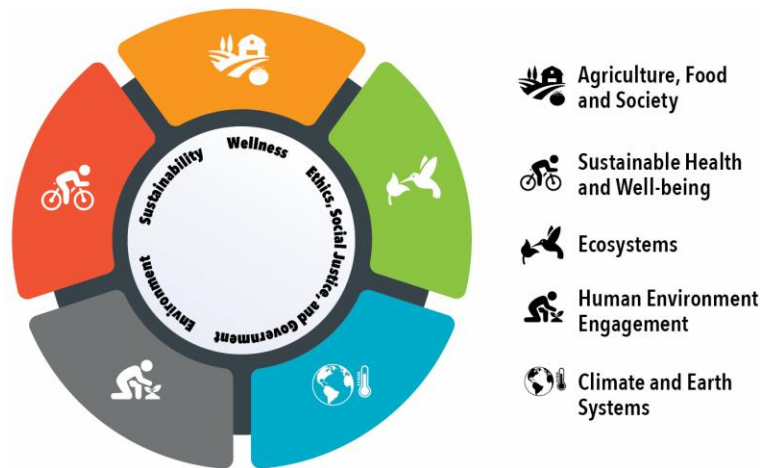


Figure 1: Depiction of SEBS core focus areas with consilience themes.

Within this model, our scholarship, teaching, outreach, and engagement are grounded in specific disciplines that are currently organized into 15 departments (**Table 1**), while incorporating the innovative interdisciplinary cooperation necessary to anticipate, assess and address defined challenges. SEBS aspires to meet its mission through both traditional classroom and laboratory modalities using modern technological and pedagogical techniques, and non-traditional classroom, laboratory, and real-world learning opportunities, including experience-based training and internships both on and off campus. These ideals are further advanced through a variety of interdisciplinary institutes and centers both within SEBS (**Table 2**) and NJAES (**Table 3**).

SEBS and NJAES Departments, Institutes, and Centers

Table 1: SEBS Departments

- Agricultural, Food, and Resource Economics
- Animal Sciences
- Biochemistry and Microbiology
- Ecology, Evolution, and Natural Resources
- Entomology
- Environmental Sciences
- Food Science
- Human Ecology
- Landscape Architecture
- Marine and Coastal Sciences
- Nutritional Sciences
- Plant Biology
- Rutgers Cooperative Extension
 - 4-H Youth Development
 - Agriculture and Natural Resources
 - Family and Community Health Sciences

Table 2: SEBS Institutes and Centers

- Center for Environmental Prediction
- Center for Urban Environmental Sustainability
- Chrysler Herbarium and Mycology Collection
- Hutcheson Memorial Forest Center (off-campus)
- Institute of Earth, Ocean, and Atmospheric Sciences
- New Jersey Institute for Food, Nutrition, and Health
 - Center for Childhood Nutrition Research
 - Center for Food Systems Sustainability
 - Center for Human Nutrition, Exercise, & Metabolism
 - Center for Nutrition, Microbiome, & Health
 - Center for Lipid Research
- Rutgers Center of Ocean Observing Leadership
- Rutgers Ecological Preserve (off-campus)
- Rutgers Energy Institute
- Rutgers Gardens

Table 3: NJAES Centers and Programs

- Aquaculture Innovation Center
- Center for Blueberry and Cranberry Research and Extension
- Center for Resilient Landscapes
- Center for Turfgrass Science
- Center for Vector Biology
- Clifford E. & Melda C. Snyder Research and Extension Farm – Center for Sustainable Agriculture
- Equine Science Center
- Food Intervention Centers (North and South)
- Grant F. Walton Center for Remote Sensing and Spatial Analysis
- Haskin Shellfish Research Laboratories
- Jacques Cousteau National Estuarine Research Reserve
- Lindley G. Cook 4-H Youth Center for Outdoor Education
- New Jersey Aquaculture Innovation Center
- New Jersey Center for Wine Research and Education
- New Jersey Supplemental Nutrition Assistance Program Education (SNAP-Ed)
- New Jersey Expanded Food and Nutrition Education Program (EFNEP)
- New Jersey Water Resources Research Institute
- Office of Continuing Professional Education
- Pinelands Field Station
- Philip E. Marucci Center for Blueberry and Cranberry Research and Extension
- RU Marine Field Station
- Rutgers Agricultural Research and Extension Center
- Rutgers EcoComplex – Clean Energy Innovation Center
- Rutgers Food Innovation Centers (Bridgeton and Piscataway)
- Rutgers Fruit and Ornamental Research Extension Center
- Rutgers Plant Science Research and Extension Farm
- Rutgers University Field Station
- Youth Education and Employment Success Centers (Newark and Camden)

IV. Vision, Mission, and Values: SEBS is guided by principles that are reflected in its Vision, Mission, and Values statements:

Vision

*A Healthy and Sustainable Future that Balances the Wellbeing of
All Living Organisms with the Health of the Earth*

The existential challenges of our time, including climate change, mass extinction, resource sustainability, food security, human population growth, and social and environmental injustices are profoundly affecting the future of the earth and its inhabitants. Accordingly, SEBS aspirational vision is to be a global leader in assessing and solving these challenges, and in training the next generation of residents and scholars who will carry out this important work. This vision thus guides our mission...

Mission

*Creating, Disseminating, and Implementing Solutions to Achieve a Healthy and Sustainable
Future through Research, Education, Entrepreneurship, Outreach, and Engagement*

Our mission is to pursue excellence in research, teaching, entrepreneurship, outreach, and engagement in areas of study that address the biological spectrum from microorganisms to ecosystems, the physical and chemical environment, and the integration of natural sciences with human and societal dimensions. We pursue this mission cognizant and respectful of diverse human communities and cultural contexts that shape environmental impacts and solutions around the world. We also emphasize both theoretical understanding and practical applications of that understanding so that our community – faculty, students, staff, and alumni – are prepared to address and implement solutions to meet our current and future challenges.

Importantly, achieving our vision and meeting our mission are guided by our shared values...

Values

Access, Excellence, and Relevance

As one of the largest schools within Rutgers University, SEBS has major responsibility to provide accessible, excellent and relevant scholarship, education, outreach, and engagement to all people, both within and outside New Jersey. SEBS has an intimate and communal campus feel, conducive to learning and collaboration. These values are based on principles and standards that further motivate our endeavors:

- **Access:** SEBS highly values diversity and New Jersey is one of the most diverse states in the country. Accordingly, SEBS strives to be inclusive of all individuals regardless of race/color, national origin/ancestry, religion, age, sex/gender identity and expression, disability, genetic information, marital status, economic status, and veteran or military-affiliated status. In this regard, we aim to promote participation and to be respectful of all communities.
- **Excellence:** The pursuit of knowledge is grounded in contributions that reflect diverse perspectives and experiences. Within our scholarship and education, SEBS

strives to achieve the highest standards in a manner that is innovative, interdisciplinary, and translational.

- **Relevance:** SEBS strives to anticipate coming challenges, and thus be at the forefront of providing a healthy, sustainable, and just future for all living beings on the earth.

The preparation of SEBS Strategic Plan, as embodied by the 6 strategic goals described below, has been guided by these statements of our vision, mission, and values, as will be the implementation of the Plan in the coming years. The Plan is also aligned with the goals and aspirations of the Rutgers University and the Rutgers–New Brunswick strategic plans, which can be found at <https://universitystrategy.rutgers.edu/> and <https://nbstratplan.rutgers.edu/>

V. Strategic Goals: The first phase of the SEBS strategic planning process is to identify our goals and aspirations for the next five years and beyond. Six primary goals are identified that focus on 1) faculty, 2) students, 3) infrastructure, 4) outreach and engagement, 5) alumni, community, and industry partnerships, and 6) global engagement. The interrelationships among these goals are depicted in **Figure 2**. Importantly, the different goals are not considered in isolation, but as interdependent. For example, while faculty excellence affects the student experience, faculty excellence also is enhanced by a diverse and engaged student body. Likewise, engagement with alumni, communities, and industry on local, national, and global levels enhances faculty excellence and the student experience. Improving infrastructure supports all the other goals.

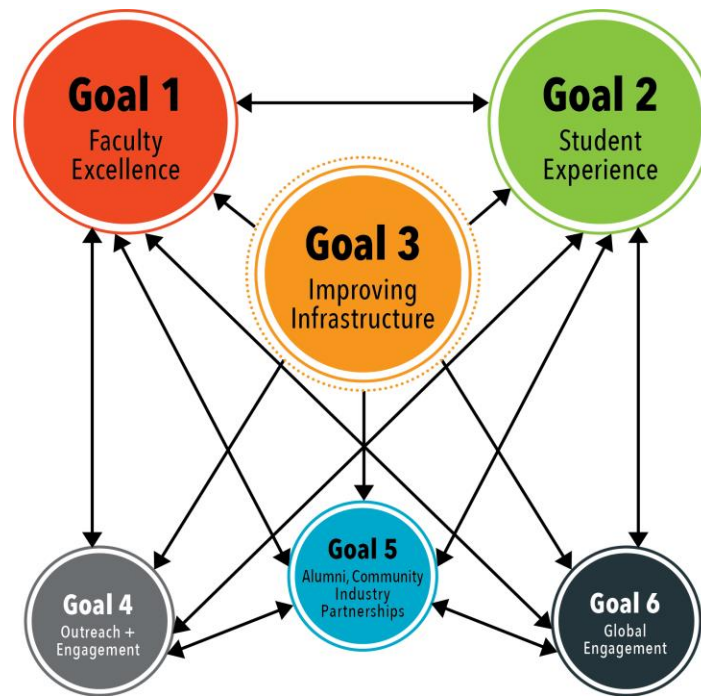


Figure 2: *Interrelationships among SEBS’s Strategic Plan primary goals.*

Each strategic goal is contextualized below by its core focus and aspirational intent. Each goal will serve as a basis to develop initiatives that evolve from discussions within the SEBS community among its faculty, students, staff and alumni.

The goals and the initiatives that arise from them will serve as guidelines for the SEBS Community and the new leadership of the School and the University as we move into the implementation phase of the Plan (see Plan Implementation section). The Plan is considered to be a living document, in which goals and initiatives can be developed and modified as they are considered for advancement based on the collective inspiration of the faculty, students, staff, and administration, and the availability of resources.

A. Goal #1: *Advance interdisciplinary research that promotes health and wellness, global sustainability, social justice and ethical governance in the face of a changing planet.*

1. Core Focus: Promoting Faculty Excellence and Impactful Research
2. Aspiration: Substantially influence the sustainable health of our planet and its inhabitants through innovative scholarship and transformational educational experiences.

B. Goal #2: *Educate and train the next generation of educators, scientists and leaders who will advance and foster our vision for a healthy and sustainable future.*

1. Core Focus: Enhancing the Student Experience
2. Aspiration: To ensure that SEBS undergraduate, graduate and post-graduate programs are world-class in knowledge, synthesis, and hands-on experience.

C. Goal #3: *Facilitate and promote hands-on, experience-based research and education by investing in state-of-the-art classrooms, research facilities and living laboratories.*

1. Core Focus: Improving Infrastructure
2. Aspiration: To provide a modern infrastructure that facilitates innovation, creativity, and inspiration for our hands-on research and education.

D. Goal #4: *Expand our leadership role in communicating and implementing the Rutgers 21st century land-grant mission to transform the lives of New Jersey residents and beyond.*

1. Core Focus: Enhancing Outreach and Engagement
2. Aspiration: To improve overall quality of life for all New Jersey residents and beyond through the dissemination and application of evidence-based knowledge.

E. Goal #5: *Promote engagement of alumni, community, government, and industry partners to advance our vision and mission.*

1. Core Focus: Promoting Alumni, Community, and Industry Partnerships
2. Aspiration: To be a life-long source of inspiration, pride, and resources for our alumni, state-wide communities, state government, and industry partners.

F. Goal #6: *Build global inclusivity across the School through engaged research, learning, and community engagement by promoting international experiences, grants, partnerships, and engagement supportive of the SEBS core mission of a healthy and sustainable future.*

1. Core Focus: Expanding Global Engagement
2. Aspiration: Provide internationally focused learning, research, and engagement across the SEBS community including faculty, students, staff, and alumni.

VI. Plan Implementation: The second phase of the SEBS Strategic Plan will focus on initiative development, implementation, timeline and metrics for evaluation. The proposed initiatives will be wide-ranging, aspirational, and ambitious. Because of the pending changes in School and University leadership, as well as uncertainties in the availability of resources, the path forward for implementation and evaluation of any given initiative remains to be determined.

Accordingly, the Plan does not provide detailed implementation plans for any proposed initiatives. Rather it provides an outline of the implementation process now that the first phase of the Strategic Plan (this document) has been approved by the SEBS faculty.

Steps toward Strategic Plan implementation –

- a. The faculty-approved Plan will be presented to University President-Designate, Jonathan Holloway and Rutgers-New Brunswick Chancellor, Christopher Molloy.
- b. The Plan will be made available for use in the recruitment of the new Executive Dean for SEBS. As a living document, the plan will continue to evolve based on their feedback, insights, and emerging goals and aspirations.
- c. The plan will be distributed to leadership across Rutgers–New Brunswick – Schools, Institutes, Student Affairs, Rutgers Global, etc. – to encourage dialogue that may generate more ideas and mutually beneficial synergies.
- d. Through a process of ongoing discussions within SEBS, Rutgers, and other aligned stakeholders, the School’s leadership – the new Executive Dean in consultation with the SEBS Executive Leadership Team (ELT) and the SEBS Chairs Council – will identify priority initiatives that serve to further the strategic plan goals.
- e. Teams of faculty, administration, staff, students, and alumni will be identified to develop and champion specific priority initiatives. These teams will develop preliminary proposals that will be included in a portfolio of initiatives for consideration by the Executive Dean.
- f. The Executive Dean, the ELT, and the Chairs Council, in consultation with the initiative teams and other stakeholders, will review the proposals (and edit as needed). A funding plan will be developed for approved proposals and implementation will begin. In some cases, pilot programs will be encouraged to assess potential for meeting initiative goals.
- g. School leadership will conduct regular evaluation of implemented initiatives using relevant metrics to determine progress and impact.