

## Overview of Our Value Creation Story

Our *raison d'être* is to contribute to society and enrich the lives of our employees by maintaining the highest standards of integrity, which is a cornerstone of our management philosophy. We aim to help realize a sustainable world where people live with peace of mind through activities rooted in our process for value creation, "Identify, Develop and Expand." To that end, we set the "Ideal NAGASE" for 2032, our 200th anniversary, as a Business Designer that creates a sustainable future. The

concept of a Business Designer is working with partners to bring together trading, R&D, investment, global network, manufacturing, logistics, and other functions to create new businesses. By responding flexibly to the external environment and constantly evolving business, we will promptly identify issues facing our customers and society and generate value that leads to solutions. The NAGASE Group will contribute to the development of sustainable society by enhancing economic and social value.

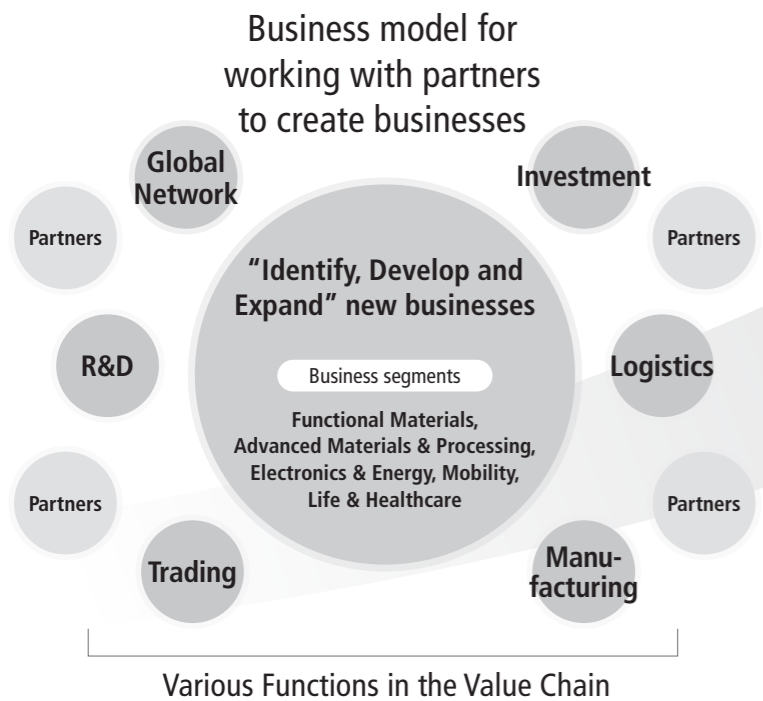
Contribute to Realize  
a Sustainable World  
Where People Live  
with Peace of Mind



Backcasting



Providing Values to Stakeholders



### Our Risks and Opportunities

- Technological innovation
- Climate change and resource shortages
- Demographic changes
- Industrial reorganization

»See P14–15, "Our Risks and Opportunities"

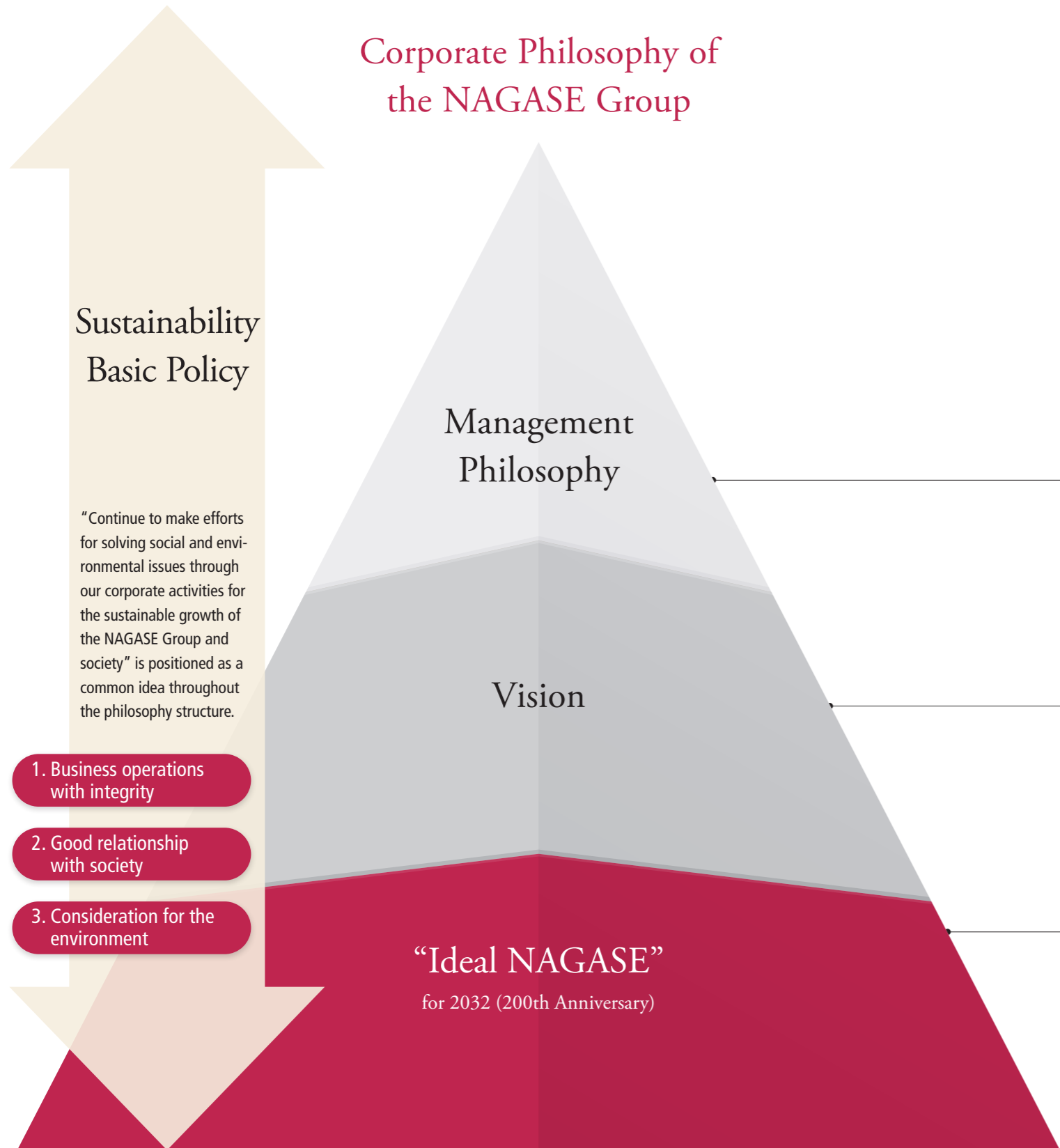


»See P30–31, "Business Model Evolution Looking to the Future"

»See P8–9, "Our Business Model"

# Our Social Significance

## Corporate Philosophy of the NAGASE Group



When we established our new medium-term management plan ACE 2.0, we updated our philosophy system in response to dramatic changes in the external environment. We positioned the “Ideal NAGASE” for 2032, our 200th anniversary, as a Business Designer that creates a sustainable future. We also established the Sustainability Basic Policy as a way of thinking shared throughout our value system, including our management philosophy and vision. By embodying these common values in our daily activities, each of us contributes to realize a sustainable world where people live with peace of mind.

# “Identify, Develop and Expand”

## The NAGASE Vision

- We recognize our responsibility to society and offer beneficial products and services while maintaining the highest standards of integrity. Through our growth, we will contribute to society and enrich the lives of our employees.
- To realize a sustainable world where people live with peace of mind, each of us embodies our value proposition, “Identify, Develop and Expand” through daily activities.
- Business Designer that creates a sustainable future:**  
“Identify, Develop and Expand” — Contribute to the development of a sustainable society.

- **Strengths/ Characteristics**
  - Maintaining the highest standards of integrity** for almost 200 years
  - Working with partners** to enable new businesses
  - Driving new technologies** with knowledge and experience
  - Staying a step ahead of the market** to actively offer solutions
- **Value Creation**
  - » **Identify**  
We discover untapped business opportunities
  - » **Develop**  
We convert opportunities into customer value
  - » **Expand**  
We deliver solutions to multiple fields and regions
- **Vision for the Future**
  - We will contribute to a sustainable world where people live with peace of mind

# History of Value Creation

## 1832-

### Founding



Founder Denbei Nagase

The NAGASE Group traces its roots to 1832 when founder Denbei Nagase established Urokogataya, a dyestuffs wholesale business that handled safflower, *funori* seaweed and starches in Nishijin, Kyoto. Later on, we established a foothold in the chemical industry by starting to handle synthetic dyes.

## 1901-

### Forging Ties with Leading Overseas Manufacturers



General Electric Co. (GE)

Entering the 1900s, the NAGASE Group started doing business with overseas manufacturers to pursue the possibilities of chemicals. As it expanded its import business, NAGASE established an office in Lyon, France in 1901. That spurred the expansion of partnerships with overseas manufacturers, including Basel Chemical Co. of Switzerland (at that time called Ciba), as well as Eastman Kodak Co. (now Kodak) and DuPont of the United States. While importing state-of-the-art products from overseas, including technology not yet available in Japan, and making great strides as a trading company specializing in chemical products, the NAGASE Group delivered new value.

## 1970-

### Enhancing Functions as a Manufacturer



Panoramic view of Ciba in 1893

Since its founding, the NAGASE Group has engaged in diverse operations. In 1970, it established Nagase-CIBA Ltd. (now Nagase ChemteX Corporation) as a joint venture with Ciba for manufacturing epoxy resins. The following year, it established Engineering Plastics, Ltd. (EPL) in a 50-50 joint venture with GE. It also built several new plants as part of steps to strengthen and expand its manufacturing, processing, and other functions as a manufacturer.

## 1990-

### Demonstrating Advantages in R&D Functions



Nagase R&D Center

From the 1990s, the NAGASE Group began enhancing its R&D functions in earnest. In 1990, it established the Nagase R&D Center as a base for R&D into bio-related materials. In the 2000s, it established Nagase ChemteX (Wuxi) Corporation in China as an epoxy resin plant for Nagase ChemteX Corporation. It also made Pac Tech-Packaging Technologies GmbH of Germany a subsidiary. In 2007, it opened the Nagase Application Workshop, an open innovation laboratory, in a push to also secure an advantage in R&D functions.

## 2010-

### Gearing Up the Food Ingredients Business



Prinova Group

In the 2010s, biotechnology also started to gain more attention. In 2012, the NAGASE Group made the biotechnology specialist Hayashibara Co., Ltd. a subsidiary to strengthen its food ingredients business. In 2019, it made Prinova Group LLC, a U.S.-based company that sells and processes food ingredients and has a global sales network, a subsidiary. By generating synergies among the new Group companies, NAGASE brought its food ingredients business into full swing and global development.

## 2015-

### Promoting Sustainability as a Business Designer



The NAGASE Group has grown into a corporate entity with diverse functions, including trading, manufacturing, processing, and R&D. While leveraging and adding on to those functions, it strives to create an array of value. It has also been focusing on sustainability management in recent years. NAGASE aims to help solve social and environmental issues for the sustainable growth of society and the Group.

Fiscal year ended March 31, 1967  
(Non-consolidated)

Net Sales: **65.0** billion yen  
Total Assets: **27.5** billion yen  
Operating Income: **1.8** billion yen

Fiscal year ended March 31, 1987  
(Non-consolidated)

Net Sales: **430.5** billion yen  
Total Assets: **193.6** billion yen  
Operating Income: **6.4** billion yen

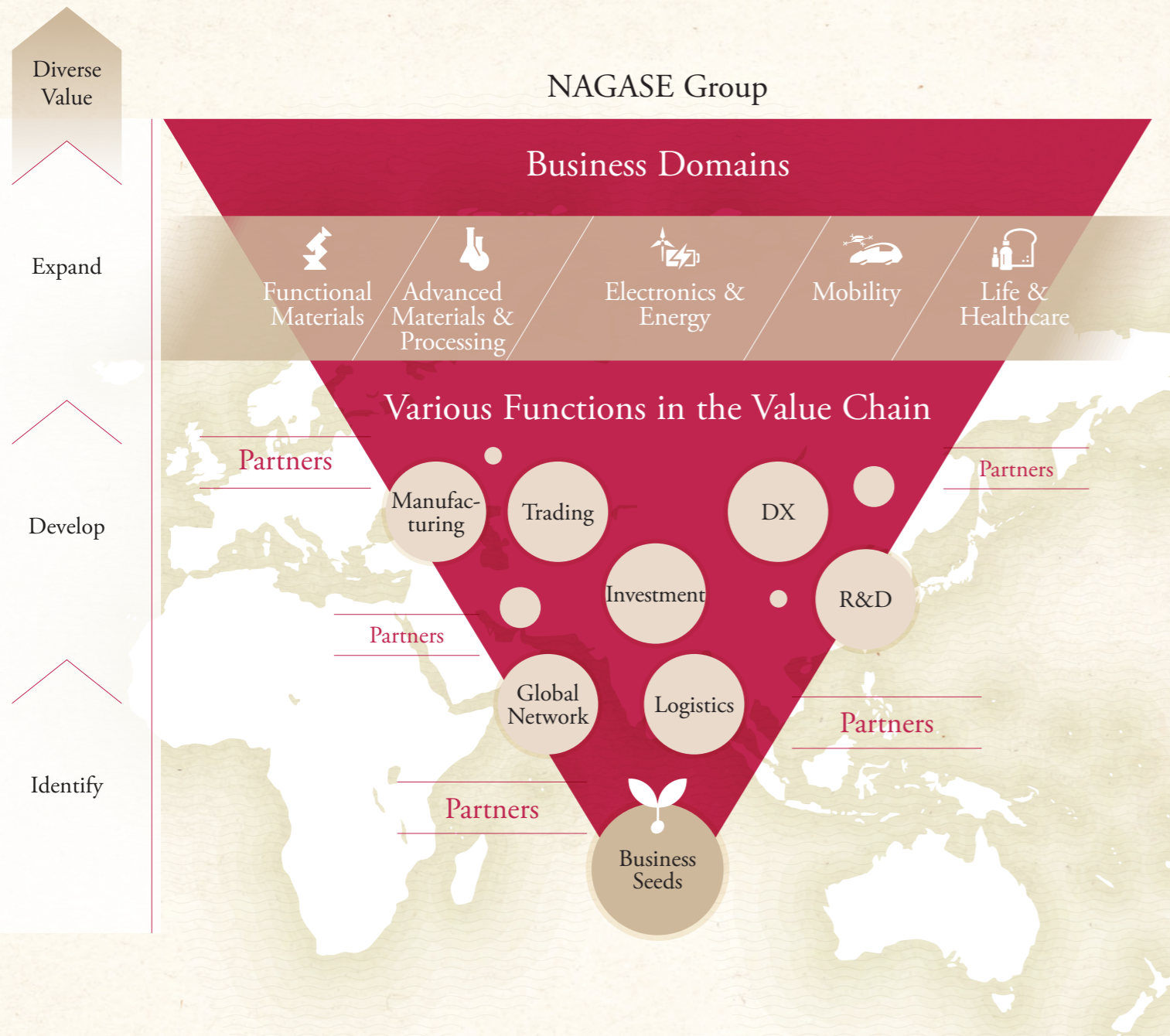
Fiscal year ended March 31, 2007  
(Consolidated)

Net Sales: **701.3** billion yen  
Total Assets: **422.8** billion yen  
Operating Income: **21.6** billion yen

Fiscal year ended March 31, 2021  
(Consolidated)

Net Sales: **830.2** billion yen  
Total Assets: **640.5** billion yen  
Operating Income: **21.9** billion yen

# Our Business Model



## A Business Designer Working with Partners to Create an Array of Value through “Identify, Develop, and Expand”

The technologies that the NAGASE Group has cultivated over its 189-year history are one of its strengths. In addition to trading capabilities with a wide array of business domains and an extensive global network, it has enhanced its manufacturing, R&D, and other capabilities. In addition, it has strengthened new functions such as digital transformation (DX) to evolve into a corporate group that creates a myriad of value.

The NAGASE Group brings together those capabilities in working with partners to identify the seeds of technologies and businesses, develop them into new value, and expand that through business development that goes beyond borders and domains. Delivering an array of value to society and customers as a Business Designer developing unique businesses that set us apart from competitors is our current business model.

# Our Strengths



## Global Network

<p><b>Japan</b></p> <p>We aim to enhance economic and social value through sustainability management such as promoting bio business, not just core businesses.</p>	<p><b>Greater China</b></p> <p>Greater China accounts for the majority of sales in the NAGASE Group outside of Japan. Operations currently cover mainland China in the semiconductor mobility, electronics, life and healthcare, chemicals, and advanced materials and processing fields.</p>	<p><b>ASEAN and the Middle East</b></p> <p>We are promoting a shift to high added value in core businesses like plastics and mobility-related businesses. We are also working to expand business targeting non-Japanese customers, help solve regional social issues, and create businesses that meet the needs of the region in which they are located.</p>
<p><b>Europe</b></p> <p>Mainly engaged in the pharmaceuticals and chemicals businesses. The Group is also focusing on innovative areas such as bioplastics, energy storage, and organic food packaging materials, working to reduce environmental impact.</p>	<p><b>Americas</b></p> <p>We are concentrating on the food ingredients and mobility businesses. Leveraging the Group's manufacturing, R&amp;D capabilities, and network, we aim to create new businesses to support future growth.</p>	<p><b>South Korea</b></p> <p>We are investing resources in fields where sustainable growth is likely, focusing on electronics business, including semiconductors, displays, and EV batteries where South Korea is very competitive globally.</p>

<p><b>Consolidated Net Sales</b></p> <p>830.2 billion yen Overseas 467.0 billion yen</p>	<p><b>Overseas Sales to Net Sales</b></p> <p>56.3%</p>	<p><b>Number of Bases</b></p> <p>30 Countries and Areas    117 Companies</p>
<p><b>Number of Manufacturing Companies</b></p> <p>14 Countries and Areas    56 Companies</p>	<p><b>Number of Sales and Servicing Companies</b></p> <p>22 Countries and Areas    61 Companies</p>	<p><b>Number of Employees (Consolidated)</b></p> <p>6,940 Overseas 3,139</p>

» See P52-53, “Regional Strategy”

# Important Management Resources

Here, we introduce important management resources supporting the NAGASE Group's sustainable growth.

## Financial Capital

The NAGASE Group has sufficient financial capital to handle its various financial needs. Specifically, it recognizes the importance of steadily and flexibly securing funds to meet its capital requirements, including for working capital, capital investments, M&A, DX, and other investments in new growth. Its main source of capital is funds provided by operating activities. It also uses loans from financial institutions as a means of procuring funds, and obtains funds from the capital market by flexibly issuing corporate bonds and commercial paper. It takes a diversified and well-balanced approach to fund procurement.

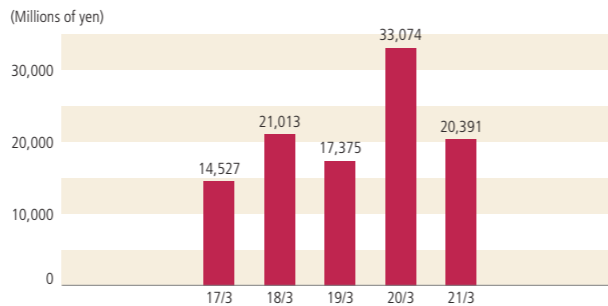
In addition, the new medium-term management plan ACE 2.0 pursues capital efficiency, and the NAGASE Group is working to that end. Specifically, it is proactively allocating funds to investments in R&D and new businesses targeting new growth upon generating cash flows through sustainable growth and portfolio improvements and securing financial soundness.

There are also functions that cut across the organization to improve productivity. A good example of that is Nagase Business Expert Co., Ltd., which was launched in 2017.

### Credit Rating

Name of Credit Rating Agency	Issuer Rating	Commercial Paper Rating
Rating and Investment Information, Inc. (R&I)	A	a-1

### Operating Cash Flows



» See P26–29, "CFO Message"

## Nagase Business Expert Co., Ltd.

### Helping Group Companies Raise Productivity and Profitability

Nagase Business Expert Co., Ltd. is a shared services company. By standardizing and streamlining intra-Group operations such as logistics, trade, payroll services, receipts and payments, credit management general affairs, account settlements, and tax services, it is helping increase productivity and profitability. It also supports the Group by developing human resources. Going forward, it will continue to contribute to the Group's

sustainable growth on the human resources front and by enhancing governance and making intra-Group operations even more efficient.

**Launched: 2017**

**Number of employees: About 240**

**(Fiscal year ended March 31, 2021)**

## Human Capital

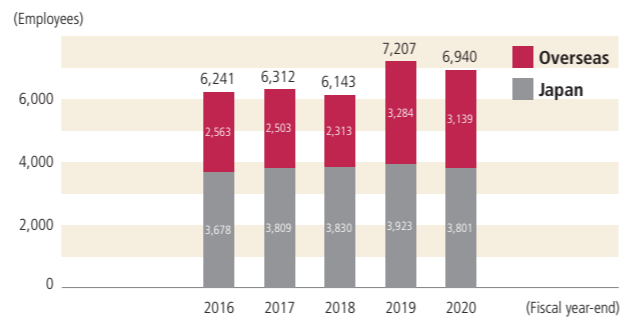
The NAGASE Group has robust human capital. Of its 6,940 employees in total, 3,139 reside overseas. It aims to build a strong organization from both fronts to strengthen human resources to drive reforms and to bolster compliance.

Human resources are a source of sustainable growth. The new medium-term management plan ACE 2.0 advocates to strengthen human resources to drive reforms as part of corporate culture reform. Specifically, it sets out to achieve sustainable growth for employees and the company by cultivating global talent who are innovative and advance change, promoting safe, comfortable, and inspirational work styles and workplaces to provide support for taking on challenges, building a corporate culture that embraces diverse personalities, and raising employee engagement.

The NAGASE Group also regards respect for employee personality and individuality and human rights in general as a prerequisite for maintaining and enhancing human resources' capabilities. It has accordingly released a

Group Code of Conduct, and conducts compliance training as needed to improve awareness among all Group employees in Japan and overseas.

### Number of Employees (Consolidated)



» See P66–67, "Human Resource Development to Drive Innovation"

## Intellectual Capital

The NAGASE Group's intellectual capital is distinctive in that it is not limited to chemicals, but extends to various domains, including electronics, automobiles, and healthcare. Another feature of the Group's intellectual capital is that it often applies for patents jointly with an array of partners such as universities and corporations as a trading company. To harness its total

capabilities and create new businesses, the Group undertakes R&D for the purpose of providing technical information and developing new technologies and products based on marketing activities. Expediting the mobilization of such expertise serves to enhance intellectual capital, which is a fount of innovative business activities.

## Nagase R&D Center

### Combining Biotechnological Expertise with Frontier Technologies

The Nagase R&D Center aims to create new value that contributes to society, including with regard to people's health and solving environmental issues, through R&D in the biotechnology field. It also aims for process innovation utilizing biotechnology, in line with its philosophy, "Unavailable Made Available in a Sustainable Way." To advance the NAGASE Group's bio-related business from the research stage, the Nagase R&D Center also coordinates with the Group companies' roughly 250 researchers. The Nagase R&D Center is putting its technologies, the marketing capabilities of each organization, and the product development and manufacturing

capabilities of Hayashibara Co., Ltd. and Nagase ChemteX Corporation to use in developing new enzymes, biochemicals, and more.

#### Developments harnessing and linking together our expertise

- Fermentation production of Trehalagin, which is expected to have antiaging effects
- Fermentation production of the so-called longevity vitamin ergothioneine

**Established: 1990**

**Location: Kobe City, Hyogo Prefecture**



## Nagase Application Workshop (NAW)

### Providing Customers with a Place for Innovation

The Nagase Application Workshop is an open innovation laboratory for plastics and coatings. As a reliable development partner to the NAGASE Group's customers, NAW provides evaluation and analysis of unique new technologies and materials, advances the development of new applications and more in an ongoing pursuit of function and design in the fields of plastics and coatings. In addition to enriching open laboratory capabilities, NAW targets global collaboration among laboratory functions within the Group. It is promoting information sharing among domestic and overseas business bases, including Nagase ChemteX

Corporation, Hayashibara Co., Ltd., and Interfacial Consultants LLC of the United States. It is also working to build systems for global cooperation in Japan, Asia, and the United States.

#### Developments harnessing and linking together our expertise

- Development of various biodegradable coating and plastic materials derived from biomass
- Color design proposals according to customer needs

**Established: 2007**

**Location: Amagasaki City, Hyogo Prefecture**



## New Value Creation (NVC) Office

### Create the Core of Future Business

The NVC Office advances the NAGASE Group's innovation. It forms the core of business looking 5 to 10 years down the line through cross-sectional collaboration among business divisions. It leads the Group in coming up with ideas and strategies in the materials, semiconductor, IoT, and healthcare domains revolving around the slogan "Creating new value from big data."

#### Developments harnessing and linking together our expertise

- Launched TABRASA™, a SaaS service for materials informatics  
» See P16–17, "[Feature] New Business Looking to the Future"
- Developed Axonerve™, an IP core for FPGA (Field-Programmable Gate Arrays) specializing in high-speed, low-latency key search, and developed application for global 5G carriers

**Established: 2017**

## Manufacturing Capital

The NAGASE Group encompasses about 60 manufacturing subsidiaries, including Nagase ChemteX Corporation, Hayashibara Co., Ltd., and Prinova Group LLC. It combines its trading and manufacturing functions to offer a wide range of solutions to customers.

This manufacturing capital is an important management resource for the NAGASE Group. As part of profit structure reform, the new medium-term management plan ACE 2.0 looks to strengthen existing businesses by

expanding added value through technological innovations and improvements in manufacturing productivity.

In addition, the Group Manufacturers' Collaboration Committee, which was launched in 2019 to bolster the foundation of domestic manufacturing companies in the NAGASE Group, is working to raise productivity and strengthen cooperation in manufacturing operations within the Group.



### Nagase ChemteX Corporation

#### Building an Abundant Future with Chemistry



Nagase ChemteX Corporation is a core manufacturing subsidiary of the NAGASE Group and possesses creative technologies in a variety of areas including electronics and biotechnology. It uses its core technologies in synthesis, formulation, and biotechnology to develop materials that are completely new to the world and create products with No. 1 market share. As a value-creating manufacturing company capable of meeting the needs of customers around the world, it will continue to embrace the challenge of developing new technologies and products.



**● Topics: Contributing to Completion of Industry's First Spikeless Track Shoe**  
ASICS Corporation's METASPRINT™ sprinters do not have spikes. Their spikeless soles use Nagase ChemteX Corporation's thermoplastic epoxy resin technology. This cutting-edge technology supports the performance of sprinters competing within 0.01 second of time.

Photo provided by ASICS Corporation



**Functional Resins**  
Epoxy adhesives, encapsulants (sheets, liquids)



**Precision Process Materials**  
Photolithography materials, 3D printing materials, silver nano ink



**Functional Chemicals**  
Special epoxy resins, transparent conductive coating materials, low-endotoxin materials



**Biochemicals**  
Food enzymes, industrial enzymes, phospholipids

**Established: 1970 Location: Osaka City, Osaka Prefecture**  
**Sales: About 26 billion yen**  
**Number of employees: About 590 (Fiscal year ended March 31, 2021)**



### Hayashibara Co., Ltd.

#### Smart Biotechnology for Better Living



Hayashibara Co., Ltd. is a core business in the NAGASE Group's life sciences field. It develops and provides ingredients for food and health foods, personal-care products, pharmaceuticals, and functional dyes. It continues to work on developing innovative new materials using its advanced biotechnology capabilities, and is increasing its presence in the global market.



**● Topics: Sponsoring an International Academic Event**

Hayashibara Co., Ltd. sponsored the online event "Nature Café on Environmental Stress and Food Crisis" organized by the multidisciplinary science journal *Nature*. Over 360 people from 85 countries around the world registered to participate in the event. There was also an exclusive meeting following the event for researchers from Hayashibara and experts in Japan and overseas. It was a meaningful event for Hayashibara as it has designated stable food security as one of its priority issues.



**Food Ingredients**  
TREHA™, SUNMALT™, PULLULAN



**Health Food Ingredients**  
HAYASHIBARA HESPERIDIN™ S, Fibryxa™, Ascofresh™



**Personal Care Ingredients**  
AA2G™, MG-60, Alpha Glucosyl Hesperidin



**Pharmaceutical Ingredients**  
MALTOSE PH, TREHALOSE SG, PULLULAN



**Functional Dyes**  
Dyes for information recording, information displays, and diagnostic agents

**Established: 1932 Location: Okayama City, Okayama Prefecture**  
**Sales: About 24 billion yen**  
**Number of employees: About 670 (Fiscal year ended March 31, 2021)**



### Prinova Group LLC

#### Global Development of Food Ingredients



Prinova Group sells food ingredients, manufactures premixes, and undertakes contract manufacturing of final products, mainly in North America and Europe. It has an edge in terms of ingredient sourcing, blending and flavor-related R&D capabilities, sports nutrition experience, and its network. Moving ahead, it looks to accelerate synergies with the Group and develop business in the Southeast Asian market.



**● Topics: New Global Website**  
In June 2021, Prinova launched its new website with extensive information on about 400 different ingredients, including nutritional materials and aroma chemicals. Going forward, Prinova plans to make the website available in more languages, including German and Spanish, and otherwise expand its functions globally.  
<https://www.prinovaglobal.com/>



**Ingredients**  
Distribution  
Over 2,000 ingredients



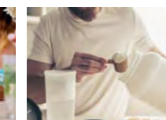
**Aromas**  
Distribution  
Aroma chemicals, essential oils



**Premixes & Solutions**  
Premixes, OEM, beverages, tablets, food applications



**Flavors**  
Manufacturing  
Beverages, functional food applications



**Armada**  
Nutritional food development, manufacturing solutions, sports nutrition

**Founded: 1978 Location: Illinois, USA**  
**Sales: About 87 billion yen**  
**Number of employees: About 1,000**  
**(Fiscal year ended December 31, 2020)**

## Group Manufacturers' Collaboration Committee

### Charged with Reinforcing the Domestic Manufacturing Foundation

The Group Manufacturers' Collaboration Committee's (MCC) role is to promote cooperation among manufacturing companies within the Group, independent growth at each company, and sustainable growth and enhancement of corporate value for the Group overall. In the fiscal year ended March 31, 2021, the MCC held committee, secretariat, activity briefing, and other meetings. In particular, discussions were held among 11 MCC member companies to set shared KPIs pertaining to safety, quality, and the environment. In the fiscal year ending March 31, 2022, the MCC plans to increase committee and secretariat members and enhance subcommittees, and will bolster the Group's

manufacturing collaboration through various activities, including promoting DX in manufacturing, addressing environmental needs, improving quality, and raising safety and health standards.

**● Topics: Engaging Advisors to Accelerate Personnel Development**  
The MCC engages advisors with management experience that have worked in manufacturing for a long time, and plans and carries out various human resource development initiatives. In addition to periodically releasing to Group employees videos of interviews based on the theme of manufacturing and symposiums where employees of MCC member companies exchange opinions, the MCC plans events such as manufacturing site tours and lectures.

## Social Capital

Solid relationships of trust with diverse stakeholders are very important social capital for the NAGASE Group. The Group operates globally in a wide range of business domains. It has 117 business bases in 30 countries and

regions around the world, and roughly 18,000 business partners in total in Japan and overseas.

## Natural Capital

The NAGASE Group believes that a sustainable global environment is a prerequisite for continuing our business operations. To maintain and enrich such natural capital, the NAGASE Group helps realize a sustainable society by actively working to solve environmental problems. That includes striving

for a carbon-neutral and recycling-oriented society, preventing pollution, preserving biodiversity, and efficiently using water.

» See P68-69, "Creating Environmental Value"

# Our Risks and Opportunities

## Technological Innovation

In this age where global competition is increasingly fierce, it is difficult to survive by maintaining conventional business models alone. Since the digital technological revolution is bringing especially dramatic changes to all sorts of industry structures, taking the initiative to drive innovation and create new business opportunities is vital.



### Risks and Opportunities for the NAGASE Group

#### Risks

The NAGASE Group could become unable to put its value into full play as the evolution of digital marketing and emergence of digital platforms shrink the information gap between customers and suppliers.

#### Opportunities

We are actively investing in DX. Through that, we will increase our points of contact with markets and cultivate new business opportunities to establish business advantages.

In this section, we cover four key factors with significant influence on the future of stakeholders and the NAGASE Group. They are technological innovation, climate change and resource scarcity, demographic changes, and industry reorganization.

## Demographic Changes

According to the *2019 Revision of World Population Prospects* released by the United Nations, the world population could reach nearly 11 billion people by the end of this century. While the population is increasing, demographics are also changing significantly, mainly in developed countries, due to longer life expectancy and declining birthrates. Such changes in the global population's scale, composition, and distribution greatly affect business activities.



### Risks and Opportunities for the NAGASE Group

#### Risks

Factors such as rising populations in emerging countries could accelerate changes in production and consumption behavior on a global basis. Also, the declining birthrate and aging population in Japan reducing the Japanese market's relative status in industry is a concern.

#### Opportunities

In regions that are yet to be fully developed, there is potential for capturing new business opportunities by building and enhancing supply chains in part by utilizing DX.

# NAGASE Group

## Climate Change and Resource Scarcity

We are already seeing many forms of impact from climate change. With the move to a carbon neutral society gaining steam, we are being called upon to reduce not just our own emissions but emissions throughout supply chains. Energy and food resource shortages are also becoming more severe, partly reflecting growth of the global population. Society is looking to industries to work to solve these problems.



### Risks and Opportunities for the NAGASE Group

#### Risks

We recognize a risk of a decline in business for products with high environmental impact due to changes in customers' and business partners' needs.

#### Opportunities

Amid a shift to sustainable products, the NAGASE Group will leverage its unique technological expertise, including cutting-edge information and knowledge in the industry, biotechnology, and materials informatics, to create new markets that lead to solutions for social problems.

## Industry Reorganization

The reshuffling of alliances is underway in an array of business domains, and sales channels hitherto could change markedly. Furthermore, scope for collaboration with business partners could expand as things like an increase in open innovation cutting across business sector, industry, government, and academia borders bring about new developments.



### Risks and Opportunities for the NAGASE Group

#### Risks

The risk of supply chain revisions proceeding due to changes in sales channels and the NAGASE Group losing business opportunities is a concern. Also, heightened interest in sustainability and faster digitalization is expected to accelerate technological progress and intensify competition.

#### Opportunities

As sales channels undergo revisions and customers consolidate business partners, the NAGASE Group's business opportunities are likely to expand as its ability to solve problems, expertise, and technologies in various industries are recognized. Additionally, there is potential for the Group to deliver value that demonstrates a genuine understanding of customers' new needs by addressing sustainability, investing ahead of time in digitalization, and so forth.

# [Feature] New Business Looking to the Future

## NAGASE's Biotechnology

### Harnessing the Group's Underlying Technologies to Create Eco-Friendly Sustainable Businesses

Bio-related business is under the spotlight now from the perspective of environmental consideration. The NAGASE Group is working to harness the biotechnology of Group companies to develop new sustainable materials that are in tune with the times. It established the NAGASE Biotech Office in April 2021 as an intra-Group organization to promote such initiatives.

The NAGASE Group has a wealth of underlying technologies related to R&D and production of microorganisms, fermentation products, enzymes, and products of enzyme reactions. The Nagase R&D Center (NAGASE & CO., LTD.), Nagase ChemteX Corporation, and Hayashibara Co., Ltd. previously worked individually to develop technologies. However, that held them back from making dramatic developments as they inevitably focused on their respective technologies.

NAGASE had the idea that it would be able to deliver new technological value not found elsewhere and powerfully embark on developing new materials meeting customers' and business partners' needs if it could mobilize such biotechnology as a Group. Based on that belief, it launched the NAGASE Biotech Office bringing together members from the Nagase R&D Center, Nagase ChemteX, and Hayashibara.

### Combining Biotechnology with Unique Technological Value

The NAGASE Group's biotechnology, including that pertaining to fermentation products, enzymes, and products of enzyme reactions, can be used to provide a wide array of solutions. That is a unique feature of its biotechnology not found at other companies. The NAGASE Biotech Office has been charged with two missions. One is to create themes for developing new materials that bring together the Group's underlying technologies. Another is to devise business concepts across the Group to commercialize those themes.

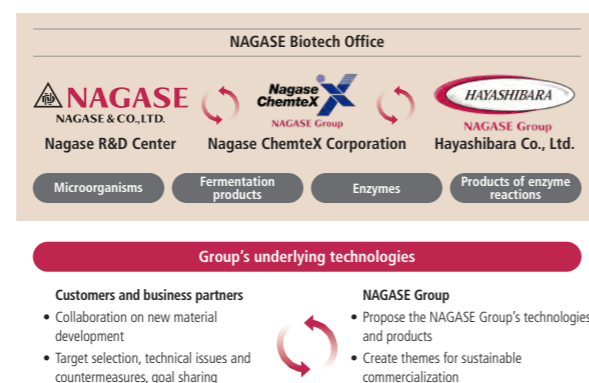
As for domains, the NAGASE Biotech Office will develop new materials with higher added value in health food, cosmetics, pharmaceuticals, and medicine, along with food ingredients, which the three member entities have mainly targeted to date. It also aims to propose new sustainable materials with more added value in the chemicals and electronics fields going forward.

On the technology front, we will roll out the NAGASE Integration Technology (NIT) strategy. NIT classifies the three member entities' biotechnology strengths into four categories: screening, improvement

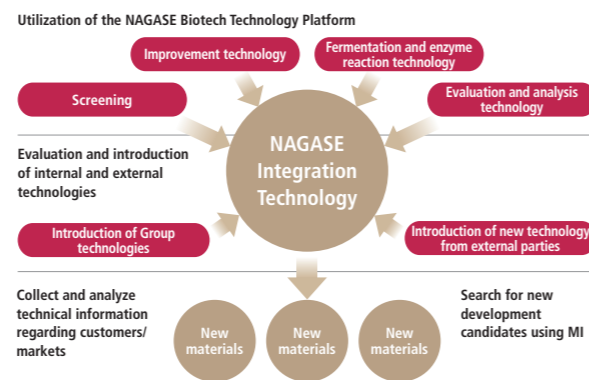
**Naoki Shirasaka**  
Manager  
NAGASE Biotech Office



#### NAGASE Biotech Office's Framework for Specialized Creation



#### R&D via NIT



technology, fermentation and enzyme reaction technology, and evaluation and analysis technology. By selecting and integrating technologies based on that framework, NAGASE will develop new biotechnology that only it can. NAGASE will also work with the service utilizing the TABRASA™ new material search platform employing AI that it launched in November 2020 to offer the possibilities and value of new materials to the market since there are strong synergies between biotechnology and digital tools.

Concrete development themes and steps towards commercialization are already underway. NAGASE will speed up initiatives to use its biotechnology to generate value that is aligned with customer needs and helps to solve environmental and social issues.

How does the NAGASE Group view its external environment and how will it create opportunities for future growth? This feature explores NAGASE's biotechnology and TABRASA™, keys to the Group's growth moving forward.

## TABRASA™

### Contributing to the Sustainable Development of Japan's Materials and Chemical Industries by Supporting Companies' MI

**Natsuki Morishita**  
Project Leader  
Materials Informatics  
Promotion Team  
New Value Creation (NVC) Office



The NAGASE Group jointly developed the TABRASA™ platform for materials informatics (MI), which utilizes AI to revolutionize new material development, with International Business Machines Corporation (IBM), and started providing it to external parties as a SaaS service in November 2020.

The social environment is changing at a dizzying rate, and materials development is becoming tougher as its pace and functional requirements are also increasing each year. MI has advanced mainly in Europe and the United States, while Japanese companies have been slow to take initiatives on this front. Notably, medium-sized companies are finally just starting to invest in MI, and they must overcome major obstacles in terms of costs and specialist personnel to do so.

NAGASE has provided TABRASA™ as a service to other companies instead of only using it in-house because it has customer networks covering an expensive range of industries and wants to contribute to the sustainable development of Japan's materials and chemical industries by supporting medium-sized companies' MI initiatives. At the same time, NAGASE believes this is likely to raise its status as a solutions provider.

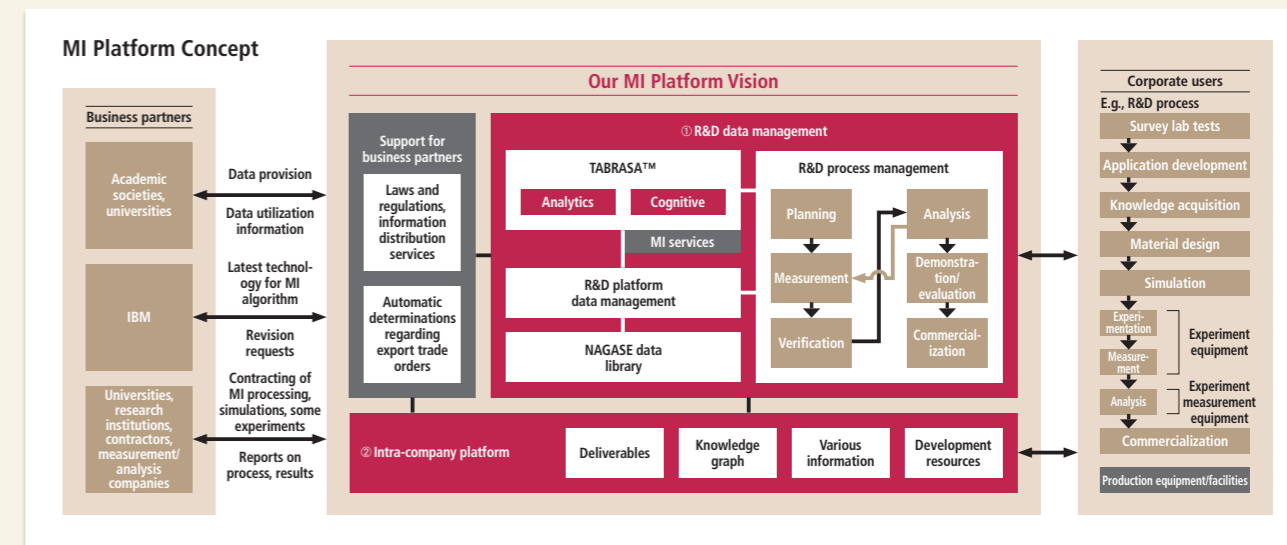
### Aiming for a Platform to Support Value Creation in R&D

TABRASA™ features two different engines. One takes an analytics approach and the other a cognitive approach. MI generally entails using

machine learning based on a certain volume of data to making projections about things like physical characteristics and molecular structure. That corresponds to TABRASA™'s analytics approach. Using that approach requires preparing a large volume of data and inputting it. In contrast, the cognitive approach can reduce the work entailed in preparing data by using AI to read data from documents such as theses, and structure that data to generate new knowledge. TABRASA™'s unique strength is that it has both an analytics and a cognitive engine.

Of course, customers can freely utilize the results of materials searches obtained using MI. We have currently received feedback from over 100 corporate customers, and plan to continue to gradually add new functions to the platform moving forward. Our target for the future is a MI platform for resolving various issues, including provision of a matching forum for trading data and resources that will become sources of value (diagram below).

Using TABRASA™ will dramatically change the way R&D is done in materials development. Naturally, it will make development more efficient. It should also enhance creativity and innovativeness, and speed up innovation overall. The NAGASE Group envisions a future where faster innovation wields great influence in solving social issues.





# Our Sustainability Management

The NAGASE Group identified priority issues (materiality) for sustainability based on providing value to stakeholders. Through the establishment of the Sustainability Basic Policy as a way of thinking shared throughout our value system along with the pursuit of activities to “Identify, Develop, and Expand” espoused in the NAGASE Vision, we will contribute to the realization of a sustainable society.

## Sustainability Basic Policy

The measures for sustainability-related issues lead to the highest standards of integrity that the NAGASE Group pursues as its management philosophy and the world in our vision for the future. We acknowledge that continuing corporate activities that contribute to the solution for social and environmental issues enables sustainable growth, and thus we make proactive efforts by developing a policy for sustainability activities.

### 1. Integrity in Business Activities

- We shall conduct our corporate activities in compliance with all applicable national and regional laws and regulations, and in keeping with societal norms and common sense.
- We shall strive to prevent corruption of all kinds and maintain healthy and proper relations with our partners and government entities.
- We shall strive to provide safe, high-quality products and services, and seek to maintain and improve the value to our customers and business partners.
- We shall safeguard the benefit to the consumer through maintaining and promoting fair and free competition.
- We shall strive toward rigorous management and protection of information about our customers and our company.

### 2. Positive Relations with Society

- We respect human rights and do not permit any sort of discriminatory conduct. We absolutely refuse to accept infringements of human rights such as forced labor or child labor.
- We respect the cultures and practices of national and regional societies, and maintain positive relations with society.

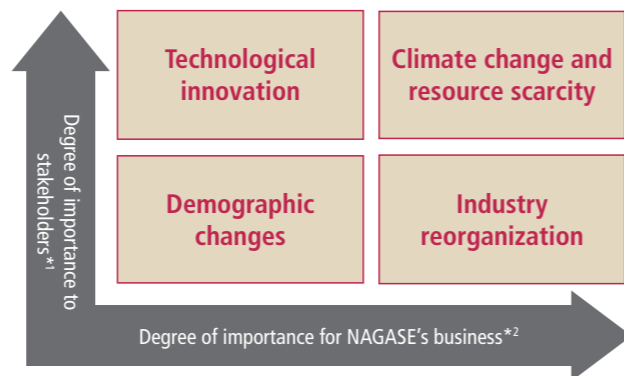
- We shall strive to ensure health, safety, and appropriate communication with our diverse stakeholders.
  - We shall constantly pay detailed attention to sustainability among our suppliers, and shall work to make corrections should there be any doubt to their sustainability.
  - We shall proactively disclose corporate information as appropriate.
- ### 3. Consideration for the Environment
- We shall comply with national and regional environmental regulations.
  - We shall contribute to the maintenance of the global environment, including limiting climate change, preventing contamination, promoting reduction in the environmental footprint of our business activities through suppression of greenhouse gas emissions and energy consumption.
  - We shall, through environmentally conscious products and services, provide information to our customers about appropriate product usage, recycling, and disposal methods.
  - We shall contribute broadly to society through environmental conservation activities in various countries and regions.
  - We recognize the importance of biodiversity and shall strive to conserve ecosystems.

Note: Information about sustainability management is also available on our website. <https://www.nagase.co.jp/english/sustainability/about/>

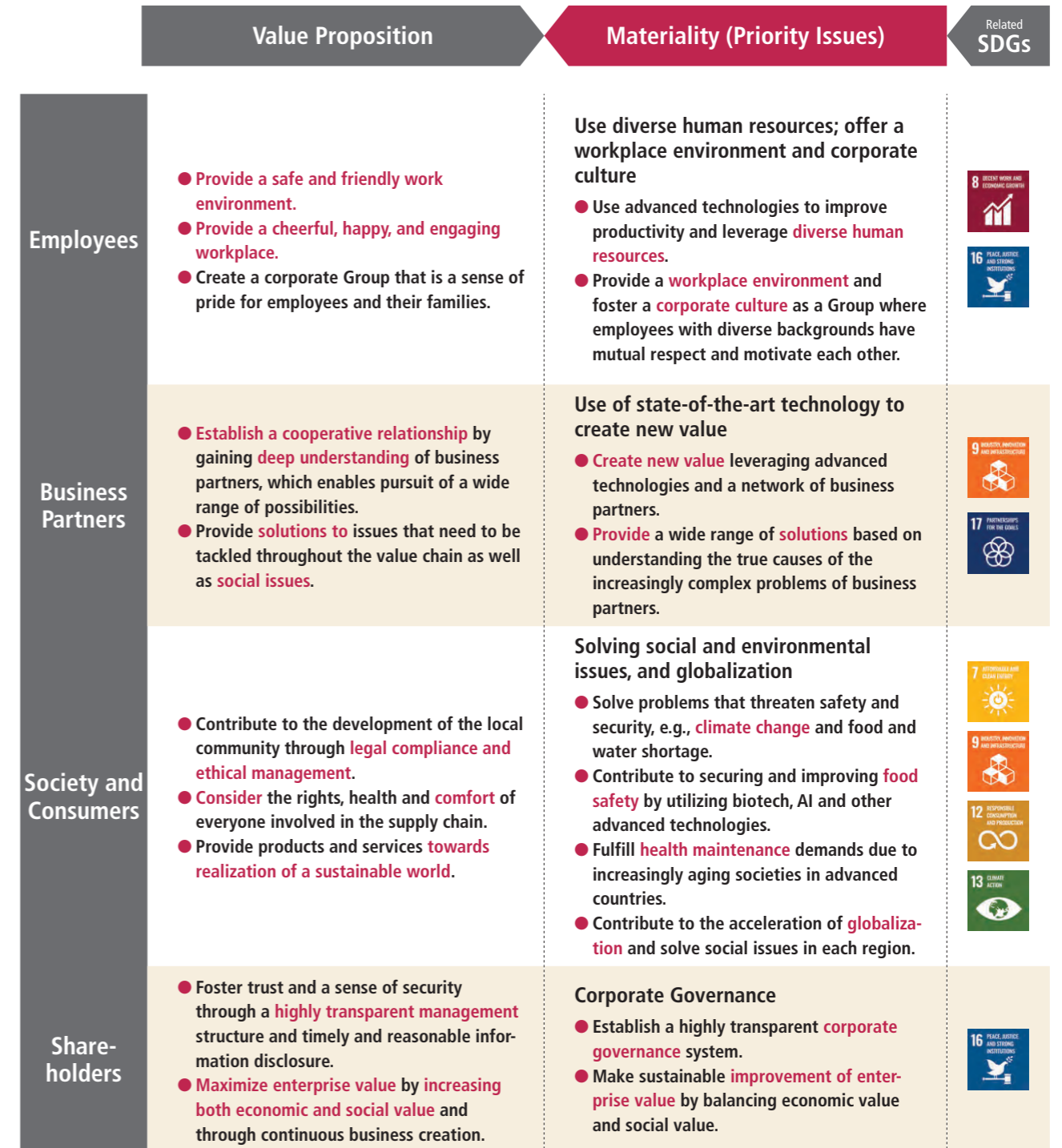
## Process for Identifying Materiality and Targets for Fiscal 2021

Management identified four issues of utmost importance to both the NAGASE Group and its shareholders, and priority issues (materiality) for sustainability based on providing value to stakeholders. We will work on these important issues through our business activities to contribute to a sustainable society. We will also set key performance indicators (KPIs) in fiscal 2021, and further advance sustainability management.

\*1: Assessed as important matters that significantly change the needs of employees, business partners, society and consumers, and shareholders.  
 \*2: Assessed as important matters presenting opportunities for new and existing businesses as well as threats to existing businesses and business continuity.



## Delivering Value to Important Stakeholders and Materiality (Priority Issues)



»For more about sustainability management, see P54–72

## Sustainability Committee Establishment

In June 2020, the NAGASE Group established the Sustainability Committee. This committee is headed by the Representative Director, President and CEO and comprised of executive officers and senior management from Group companies. Its main activities include formulating policies for promoting sustainability throughout the Group, establishing and maintaining the system for promoting sustainability, monitoring various measures and policies including the status of materiality progress and dialogue with stakeholders, and conducting educational activities within the Group.

»For more about the sustainability promotion structure, see P37, “Corporate Functions Supporting Reform”