Research Laboratory for IDEA

Members

25 Researchers:

Chiharu Fujii, Yuki Ichisugi, Takehiro Suzuki, Asako Takada, Emi Tsutsui, Arini Nuran Binti Zulkifili, Midori Yanagawa, Maki Yokota, Invidiadoloria Faian Ferolin, Steven Kraines, Tetsuya Monna, Kenichiro Tsukahara, Shinichiro Morimoto, Hiroki Hatayama, Tomonori Honda, Yoon-Young Chun, Keijiro Masui, Mitsutaka Matsumoto, Toshiaki Hanaoka, Shinji Fujimoto, Kenta Takagi, Akihide Hosokawa, Kensuke Kobayashi(Guest), Katsuyuki Nakano(Guest)

26 Contract/Temporary Employees

Laboratory Leader:
Kiyotaka Tahara
Tsukuba West

Research Laboratory Outline

In April 2017, the Research Laboratory for IDEA was established at the Research Institute of Science for Safety and Sustainability. Research projects at the laboratory are conducted by members across the entire organization of AIST. The Research Laboratory currently has 24 researchers together with 20 contract and temporary staff. The mission of the Research Laboratory for IDEA consists of developing and implementing AIST-IDEA (Inventory Database for Environmental Analysis), establishing methodologies for technology assessment, and promoting international/domestic cooperation. The Research Laboratory is operated by two teams: the maintenance and management team and the methodology development team.

AIST-IDEA, the inventory database published by the Research Laboratory, is the largest inventory database in Japan, with over 5,500 processes covering all kinds of products and services in Japan. We will continue to provide this database to industry and research and development sites, and aim to build environmental impact evaluation systems that contribute to reducing environmental impact through the use of LCA, towards the realization of a sustainable society.

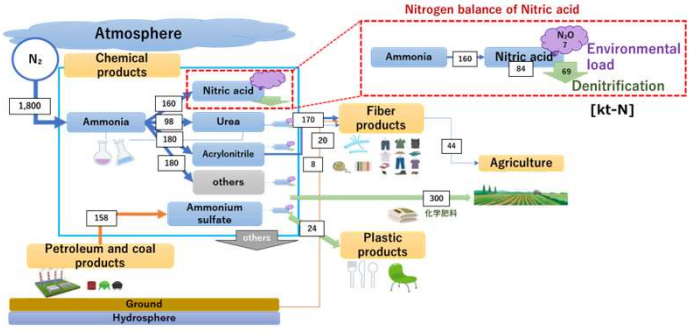
Research Highlights

Development of the AIST-IDEA Inventory Database

IDEA is being developed to guarantee comprehensiveness, reliability, completeness, and transparency. Particularly regarding comprehensiveness, IDEA covers almost all the economic activities of businesses in Japan. Representativeness is assured by using statistical averages for the data on manufacturing processes and services of Japan.

Development of Nitrogen Inventory Database

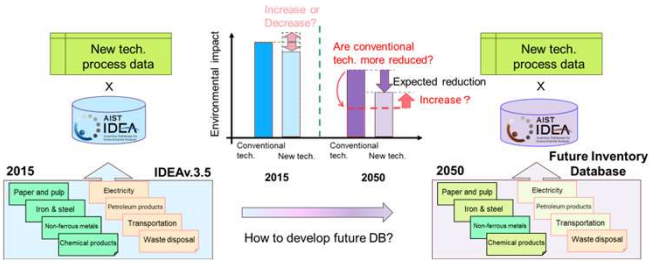
Within the concept of "Planetary boundaries" which represents the environmental capacity of the Earth, concerns have been raised that reactive nitrogen emissions caused by humanity in agricultural and manufacturing sectors far exceed capacity limits. As a countermeasure, nitrogen circular technologies are being developed to recycle harmful nitrogen compounds into ammonia. A database that can support evaluation of these technologies must include both the nitrogen compound emissions from the process and the amount of nitrogen input to the process. Therefore, we are improving AIST-IDEA to contain a balanced inventory of nitrogen inputs and outputs. Currently, we are developing nitrogen input and output data focused on chemical industries, such as the input of recycled ammonia in manufacturing industry. By using the input/output data of the developed products and the annual production volume of the products, the nitrogen flow in the manufacturing industry can be estimated.



Nitrogen Flow in the manufacturing industry of Japan (2015)

Future Inventory Database

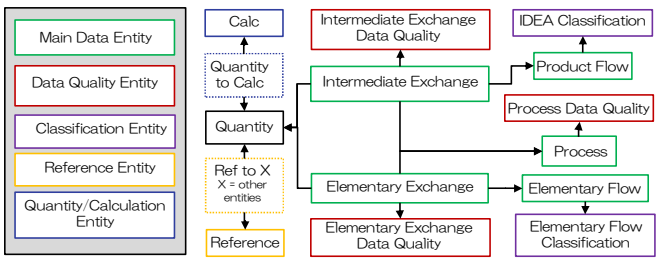
New technologies are being developed with the aim of achieving carbon neutrality in 2050. It is necessary to quantitatively evaluate how much greenhouse gas emissions can be reduced by using these technologies. We are creating a temporal and spatial expansion of IDEA to provide the inventory database needed for this calculation. We are building this database up to the year 2050 using various future scenarios.



Concept for future evaluation of new technologies

AIST-IDEA Data Model Development

In coordination with the transfer of IDEA to a large-scale data management system, we are developing a more robust data model for IDEA unit process datasets.



AIST-IDEA Data Model Development