



Ecohistory Program

TANIGUCHI Makoto | Program Director

The Ecohistory program investigates circulation, diversity, and resources from a historical point of view. We can find that there is historical causality embedded in every problem or phenomenon. This fact emphasizes the need to investigate the past to understand the present. The goal of this program is to contribute to contemporary and future societies. Like other RIHN research programs, it must also articulate global environmental issues, propose solutions, and deepen understanding of potential interactions between humanity and nature.

Current projects of the Ecohistory Program examine the environmental histories of two distinct areas, known as the 'Asian Green Belt' and 'Eurasian Yellow Belt'. In the former, communities managed to maintain sustainable livelihoods for approximately ten thousand years. In the latter region, many civilizations collapsed during the same time period. Is this understanding historically correct? What caused such difference in the productivity and sustainability of the two regions? This question is at the core of this research program; its answer is vital to the human future.

Completed Research	Leader	Title
H-02	SATO Yo-Ichiro	Agriculture and Environment Interactions in Eurasia
H-03	OSADA Toshiki	Environmental Change and the Indus Civilization
H-04	UCHIYAMA Junzo	Neolithisation and Modernisation

Agriculture and Environment Interactions in Eurasia: Past, Present and Future —A ten-thousand-year history

Project Leader **SATO Yo-ichiro** RIHN

Agriculture represents a fundamental change in relations between humanity and nature. This research project examined historical interplay of agriculture and environment, focusing on the relation between climate, crops and food consumption in three major agricultural zones of Eurasia: the Rice, Mugi, and Vegeticulture Zones. Project research was designed to reconstruct the human-environmental histories of these zones in the last ten-thousand years. We suggest that such histories can provide important insight into the contemporary and future challenges to agricultural production and food consumption. ‘Genetic diversity’ was a key concept in the study.

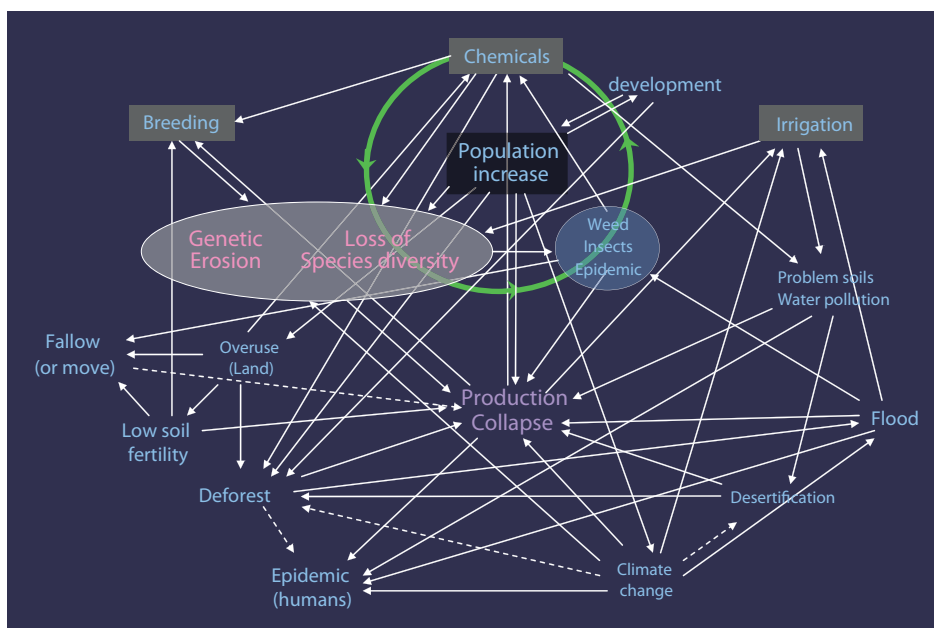
Project achievements

Project research successfully modeled agriculture-environment interactions involving multiple inter-woven factors, or what was termed the ‘Human Food Web’. Based on extensive field work and genetic analyses conducted on materials collected from all three agricultural zones, it was clearly shown that genetic diversity has decreased significantly in the course of agricultural development. Past collapses of food production indicate that epidemics were a substantial threat. The past suggests that current losses of genetic diversity increase the risk of collapse in agricultural production.

In the Rice Zone, natural and human disasters frequently disturbed food production. Following disaster,

however, human societies were able to recover production through the use of various techniques (called *shinogi* in Japanese) adapted through history. Such techniques can teach much to contemporary observers of food production. In the Mugi Zone, fieldwork revealed that the desert found throughout the region today is the result of past human over-use of lands in agriculture. This finding was based on substantial new data obtained by our research team. Such histories should lead to greater awareness of potential agricultural crisis and encourage critical reconsideration of our present agricultures. Research conducted in the Vegeticulture Zone shed light on the origins of vegeticulture, demonstrating that the process of plant domestication was a means of long-term environmental adaptation.

In total, our research indicates that in order to maintain food production and to address the difficult contemporary global environmental problems that humanity confronts today, we should not seek to ‘control’ nature, but to coexist with nature. Specialists in agriculture should therefore promote the production of genetically diverse cultivars suited to local environments, and rooted in local traditional cultures. Project researchers have presented this message to the public through a number of publications (e.g. *Agricultural History in Eurasia* Vols. 1–5, 2008–2010) and a special exhibition at the National Museum of Nature and Sciences entitled “Food for Tomorrow: Biodiversity and Sustainability” (September 2010–January 2011), which was viewed by more than 143,000 visitors.



Human food web
The model indicates that the agricultural collapse is a key element in the Web. Collapse is both a cause and an effect of other events.

Environmental Change and the Indus Civilization

Project Leader **OSADA Toshiki** RIHN

The Indus Civilization (2600 BC–1900 BC) is one of the four great ancient civilizations. It is known for its cultural and technological achievements—its characteristic seals and scripts, fortified settlements and drain systems—and also for its brief tenure. Drawing on archaeology, Indology, and palaeo-environmental investigation, this project reconstructed the social and environmental histories of several key Indus areas, and attempted to determine whether and how environmental factors contributed to their short life and rapid decline. Especially through palaeo-environmental investigation, the project attempted to enhance understanding of the relationship between long- and short-term environmental changes and human civilizations, and thus contribute to contemporary debates of environmental change.

Principal findings

In 2009 project researchers extracted cores from Rara Lake in the Lesser-Himalayan region in order to reconstruct long-term climate changes in South Asia. Preliminary core analysis shows that there were six intervals of weak summer monsoon events during the Mid-Late Holocene, and that the summer monsoon intensified as the Indus civilization declined.

Our research on regional environmental changes centers around two issues. The first concerns the long-standing debate about the Ghaggar-Hakra River. It was identified as the 'mighty' Sarasvati River in the Rig-Veda text, and therefore considered critical to Indus agricultural systems. Our team, however, established that in the Indus

period the Ghaggar was much as it is today, a rather small river highly affected by monsoon.

Sea trade between Indus regions and the west was somewhat reconstructed through study of Mesopotamian cuneiform texts. Additionally, artifacts discovered at sites in Gujarat clearly indicate that they were centers of trade with Mesopotamia and Africa. Our examinations of sea level change indicate that the important seaport Lothal fell out of use in the first millennium BC, suggesting that regional environmental change was related to the decline of trade along the coast of Gujarat.

We conclude that Indus Civilization underwent a process of transformation due to population migration from the Indus river basin to monsoon affected areas. This migration was caused by both long- and short-term environmental changes. The Indus declined; it did not collapse suddenly due to drastic natural or social events.

Research communication

Project findings have been presented in numerous international conferences and reported twice in *Science*. English publications include nine volumes of *Current Studies on the Indus Civilization* and two books—*Cultural relations between the Indus and the Iranian Plateau during the third millennium BCE* and *Language Atlas of South Asia* (2012)—from Harvard University Press. We were also active in conducting seminars and workshops in Japan and India for academics and general audiences. Currently we are preparing a book on the Indus Civilization for general readers in Japan.



The Coastal Indus Looks West

Fortified coastal settlements suggest that the Indus Civilization, once considered an insular society, shipped goods to the west

DHOLAVIRA, INDIA—Most of the year, this small island near the Pakistan border is surrounded by thick salt flats in the estuary called the Rann of Kutch. In late January, the midday heat is already intense, and the land is brown and barren. Yet more than 4000 years ago, architects and engineers designed a vast city here with high stone battlements,

is during the height of the Indus River, or Harappan, civilization. And yet Dholavira is hundreds of kilometers from the cities long considered the heart of the Indus River Valley civilization, Harappa and Mohenjo Daro, which lie far upstream on the Indus River in modern-day Pakistan. But recent digs and surveys in India's western-



Indus passports? Karamer's odd-shaped pendants may have been related to trade and travel.

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Neolithisation and Modernisation: Landscape History on East Asian Inland Seas

Project Leader **UCHIYAMA Junzo** RIHN

Project research focused on landscape change in the East Asian Inland Seas (the Japan Sea and East China Sea), a region of rich cultural and landscape diversity, from the end of Ice Age up to the present day. It emphasized two revolutionary processes of landscape shift in particular, Neolithisation and Modernisation, in order to develop a subtle and profound understanding of landscape and environmental issues in the region, and so inform a solid landscape protection and development agenda.

Earlier described as a static composition, landscape change is now considered as a process of interaction between physical environment and the culture and value systems of the inhabiting people. In the course of their everyday activities, people apply their environmental perceptions and skills to change their environment in accordance with their values and beliefs. The resulting landscape will become the nexus of identity for the next generation, which will in turn alter its environment according to its abilities and imagination. Since landscapes are the stages of everyday life, landscape study can reveal how and why environmental issues arise and can best be addressed.

Project achievements

Comparative studies of periods of significant landscape change in key areas of the East Asian Inland Seas (Fig. 1) revealed several significant insights (Fig. 2):

- (1) Neolithisation was not a short-term revolutionary event, but can be defined as a process lasting for millennia in which a sedentary lifestyle and agricultural landscapes gradually and permanently replaced previous foraging ones.



Figure 1 East Asian Inland Seas and NEOMAP workgroups

- (2) Modernisation is also a long-term process lasting for centuries, in which inter-regional networks associated with an expanding division of labour and homogenized forms of landscape were created through industrialization and extensive market systems.
- (3) Neolithisation brought about the mental separation of the human domain from nature, while modernisation created the concept that humans can subordinate natural surroundings to their control large-scale resource exploitation and land development.
- (4) Given the considerable impact of Neolithisation and Modernisation on contemporary landscapes, which themselves serve as a material and cultural base of present human-nature interactions, long-term historical perspectives should be brought to bear on future environmental policies.
- (5) The East Asian Inland Seas have allowed intense human interactions and so supported cultural unity within diverse local landscapes since prehistory. It is therefore indispensable to recognize such areas sharing historical-cultural backgrounds as areal units relevant to future environmental protection and landscape management.

Research communication

Project outcomes were published in academic journals and books, including a three-volume series on landscape history, and presented at various national and international congresses and symposia. The project has also been editing a special volume of the Journal of World Prehistory and creating an atlas of historical landscapes for the general public.

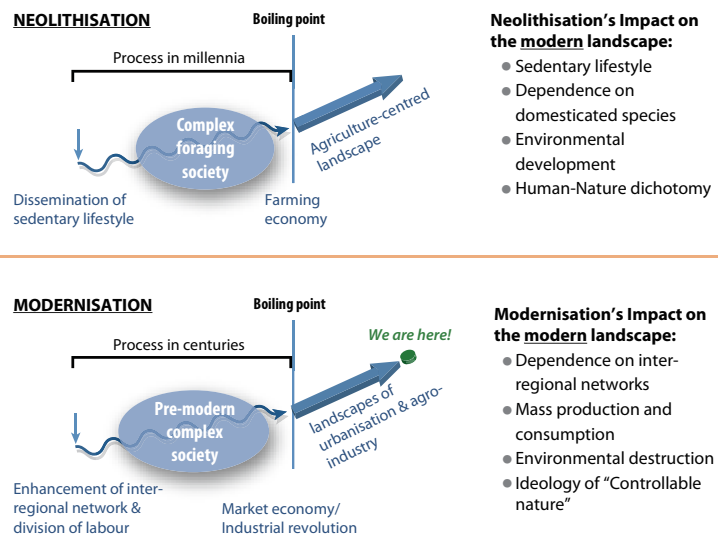


Figure 2 Neolithisation and Modernisation as historical processes of major landscape shifts