

## Final Report

(Originally submitted in January 2017; abbreviated version produced in September 2017)

**(Do not cite or circulate this report without a permission of the author)**

Project Title	Long-term Sustainability through Place-Based, Small-Scale Economies: Approaches from Historical Ecology
Abbreviated Title	Small-Scale Economies
Project Category	Individual Collaboration Project
Project Leader	HABU, Junko
Homepage	<a href="http://www.chikyu.ac.jp/fooddiversity/en/index.html">http://www.chikyu.ac.jp/fooddiversity/en/index.html</a>
Keywords	Small-Scale Economy; Diversity; Networks; Local Autonomy; Long-Term Sustainability; North Pacific Rim
Proposed project period	<input checked="" type="checkbox"/> 3 years Full Research <input type="checkbox"/> 4 years Full Research <input type="checkbox"/> 5 years Full Research

### Contents

#### **EXECUTIVE SUMMARY**

- 1. ACHIEVEMENTS IN FULL RESEARCH**
- 2. MOST NOTABLE OUTPUTS TO DATE**
- 3. PROJECT ORGANIZATION AND MEMBERS**
- 4. FIGURES AND SUPPLEMENTARY MATERIALS**

## EXECUTIVE SUMMARY

This project examines the importance of place-based, small-scale and diversified economies, particularly the importance of small-scale food production, for the long-term sustainability of human societies. For the purposes of this project, a “small-scale economy” is defined not solely on the basis of the absolute size of the economic unit, but rather in terms of the relative scale of food production within a given socioeconomic context. Our definition of small-scale economy addresses the range of local or regional networks that enable production, circulation and consumption without precluding links to the outside economy. Long-term sustainability can be defined as “the capacity of humans to create, test out, and maintain abilities to adapt to environments” over a span of *several hundred to several thousand years*. Our working hypothesis was as follows:

Highly specialized subsistence (i.e., food production) strategies can support a larger community for a short period, but a decrease in subsistence and food diversity makes the production system and its associated community more vulnerable in the long-run.

Archaeological and paleoenvironmental studies are used to test this hypothesis, or to examine the long-term impacts of the loss of subsistence/food diversity in relation to other environmental and cultural factors. To link these studies with the current discussion of the scale and methods of alternative food systems, ethnographic and ecological studies of contemporary small-scale food systems and communities were conducted. In combination, studies of the past and present point towards the future, as our research process also involves informing the collaborative design of ecologically sound and equitable food systems.

The theoretical genesis of this project is the approach of historical ecology, which conducts comprehensive research into long-term and short-term cultural change while emphasizing the impact of human activities on the environment. In particular, this project proposes that high levels of **diversity**, **network** and **local autonomy**, all of which are strongly correlated with the **scale** of the system, are the keys to achieving the **long-term sustainability** of socioeconomic systems. By integrating case studies on food diversity, the mobility of people, goods and information and the initiatives of local stakeholders in relation to the scale and resilience of societies and economies, this study aims to advance theories on the interrelationship between culture and environment, including climate change. Other cultural factors, including technological developments, sociopolitical structure and rituals/religion, are also taken into consideration (see Figure 1 in Section 5). We are publishing the results of our research as peer-reviewed articles as well as volumes for the general public in both English and Japanese.

### (2) BACKGROUND

This research aims to construct strategies for tackling global environmental problems associated with the rise of large-scale economic systems. These global environmental problems addressed by this project include soil and water contamination, a decrease in biodiversity and long-lasting damage to ecosystems caused by large and homogenized food production. In the case of agriculture, the development of large-scale monoculture with applications of a large amount of pesticides and chemical fertilizers has resulted in serious soil contamination, water pollution, loss of biodiversity, and even the destruction of whole ecosystems. The predominant measures to deal with these global environmental problems are top-down regulations enacted by national/local governments and international agencies. However, these regulations may not be sufficient when we consider long-term environmental effects on a time-span of hundreds or thousands of years. As an alternative approach, this project examines the past and present practice of place-based, smaller-scale food production systems, evaluates their advantages

and limitations, and explores their future potential.

### **(3) GEOGRAPHIC FOCUS**

Geographically, our project focuses on the North Pacific Rim. In particular, we identified northern Japan, with its solid archaeological record and its importance to contemporary food production in Japan, as the core area of our field research. The west coast of North America, with rich traditions of ethnographic and ecological investigation as well as active contemporary food/agriculture movements, provided the main comparative case studies. These two regions share a number of characteristics in common, including climate, vegetation, fauna, and a high level of seismic activity. There are also cultural ties with historical depth as a result of the migration of anatomically modern humans after the late Pleistocene. Historically, the abundance of small-scale economies supported by marine food exploitation and intensive nut-collecting also characterize these two regions.

### **(4) RESEARCH METHODS AND ORGANIZATION**

The project consists of three research groups: (1) the *Longue-Durée* Group, (2) the Contemporary Society Group and (3) the Implementation, Outreach and Policy Proposal Group:

**Group I. *Longue-Durée* Group:** Archaeological, historical and paleoenvironmental studies were used to test our working hypothesis listed above. The core case study of this group examines the mechanisms of the growth and decline of the Middle Jomon culture in northeastern Japan, with a focus on changes in food and subsistence diversity, settlement size, and rituals. Additional sub-projects were conducted to understand the broader contexts of this core case study and to develop new methodologies (particularly chemical and scientific analyses) for future archaeological studies for the region. Key comparative studies in this group come from the west coast of North America (California, the Northwest Coast), and Canadian Arctic.

**Group II. Contemporary Society Group:** Ethnographic, sociological and agroecological studies of small-scale food production systems and their associated communities were conducted to understand the complex inter-relationships among cultural and natural contributors in contemporary urban and natural settings. The core component of this group is the ethnographic study of rural communities and small-scale food production units in Iwate and Fukushima Prefectures in northern Japan, with a focus on the importance of traditional ecological knowledge (TEK), material culture and social networks. Key comparative studies in this research group come from California and the Northwest Coast.

**Group III. Implementation, Outreach and Policy Proposal Group:** The ultimate goal of this research group is to make actionable contributions to local/national policies of rural/urban development and food policy. The core component of this group is a series of outreach activities and educational programs that have been developed on the basis of our research in Iwate Prefecture in collaboration with the two other RIHN-based projects ([The Nissei project along the Hei River](#), and a National Institutes for Humanities [\[NIHU\] project on resilience against disasters](#)). Outreach and policy suggestion efforts also extend to the revitalization of indigenous communities and their identities in Hokkaido, California and Alaska, as well as actions through the 8<sup>th</sup> World Archaeological Congress in Kyoto, summer 2016 and collaborations with IHOPE (Integrated History and Futures of People on Earth).

In conclusion, this project has tested and modified the original working hypothesis through more than 50 sub-projects and case studies, clustered into three groups, each with a major focus on northern Japan, and informed by several comparative case studies. Results are already informing policy formulation, as well as making substantive and original contributions to scholarship in the relevant areas.

## 1. ACHIEVEMENTS IN FULL RESEARCH

Major outcomes of this research project include the following:

- (1) Research results of the **Group I** demonstrated the relevance of past case studies in the current discussion of long-term sustainability of human-environmental interactions.
- (2) Our project started with a hypothesis emphasising the correlations between food diversity, systems' long-term sustainability and the scale of economy/community, but our results also indicate the importance of social networks, local autonomy and traditional ecological knowledge which are often embedded in rituals and religions, local and individual identities, repetitive human actions reflected in the material culture, and traces of human impacts on the environment in relation to biodiversity. All these aspects were studied by both **Groups I&II**.
- (3) While the project duration (3 years) was too short to finalize all the action plans proposed by **Group III**, quite a number of sub-projects implemented new practices, held over a dozen outreach workshops, and made multiple statements that can be used for concrete policy proposals.
- (4) Through a series of international workshops/meetings, we were able to make **theoretical contributions** to the broader interdisciplinary discussion of local and global environmental problems, food production, demography and social inequality in the past, present and future.
- (5) Results of our project proved that **transdisciplinarity** is critical to understand the context of our research and to implement action plans on the basis of our research results. Stakeholders with which we collaborated include small-scale food producers, members of Native American Tribes, local NPOs/NGOs and local politicians.

## 1.2. SPECIFIC ACTIVITIES OF EACH WORKING GROUP

### I. *Longue-Durée* Group

**Primary Focus: Early-Middle Jomon (ca. 4000-2300 BC) in Northeastern Japan:** Using archaeological indicators of food/subsistence diversity, demography, rituals, social inequality, climate change and other socioeconomic/environmental factors, this team tested our main hypothesis with data primarily from the Tohoku region (northern Honshu) and Hokkaido, as well as from the Kanto and Chubu regions (central Honshu). Newly obtained AMS <sup>14</sup>C dates confirmed that changes in food/subsistence diversity and settlement patterns occurred at around 3000 BC, 700 years before a major cooling climate hit the area at around 2300 BC (the Bond 3 event). Thus, contrary to previous interpretations suggested by several scholars, our results indicate that the Bond 3 event was not the cause of the population decrease at the end of the Middle Jomon.

**Key Comparative Studies:** Unlike the Japanese Jomon case, examples from California and the Northwest Coast of North America indicate that wide food diversity allowed native communities in these regions to steadily increase in population through time until European contact. On the contrary, our case study from the Canadian Arctic indicates that the loss of food diversity with a focus on bowhead whaling was followed by a rapid population decrease.

### II. Contemporary Society Group

**Primary Focus: Rural Communities in Northern Japan:** Three areas in northern Japan were chosen to be our main field sites: the Hei River Area (Miyako City, Iwate Prefecture), the Joboji Area (Ninohe City, Iwate Prefecture), and Fukushima Prefecture.

Our interviews of elders, farmers, fishermen, forest industry practitioners and others in the

Hei River Area indicate that food/subsistence diversity supported by traditional ecological knowledge (TEK) play a critical role in the resilience of food systems and communities. TEK and local networks have proven to be especially important in cases of floods, typhoons, earthquakes and other disasters. In the mountainous part of this area, depopulation is a particularly serious problem, and large-scale land development plans with anticipated serious environmental damage threaten small-scale food producers. Results of our Hei Project will be published through Tokai University Press, for which we have obtained a book contract.

Our second key field site is Joboji. Subsistence practices in Joboji share a number of things in common with that of the mountainous part of the Hei River Area. Recently, Joboji began to be known as the only place in Japan where small-scale traditional lacquer-sap-collecting is still alive and commercially viable. Our interviews of lacquer sap collectors, entrepreneurs, and co-owners of a small-scale farmers' market indicate that, historically, multiple backup plans supported by wide subsistence diversity and TEK are at the core of their strategies for survival.

At our third key field site, Fukushima, we anticipated that the magnitude of the environmental damage caused by the 2011 Fukushima Nuclear Plant Accident may have been too large to test our hypothesis of the importance of food diversity, social networks and TEK. Contrary to our expectation, however, our interviews of farmers in Fukushima revealed the critical importance of TEK and local networks for maintaining residents' identity and pride.

**Key Comparative Studies:** For comparative studies, two other types of small-scale communities and groups on both sides of the North Pacific Rim were examined: indigenous small-scale communities, including Native American tribes in California, and alternative food producers, including organic farmers and practitioners of agroecology. Our research indicates the importance of TEK and social networks in maintaining resilient socioeconomic systems within local landscapes/seascapes. Our studies also revealed critical historical differences between Japan and North America, particularly in that Japanese contemporary small-scale food production systems tend to be rooted in rural communities that have never fully accepted large-scale operations, while small-scale food production movements in North America have emerged either as a resurgence of indigenous movements, or in response to currently dominant large-scale operations.

### **III. Implementation, Outreach and Policy Proposal Group**

**Main Focus: Hei River Area:** Informed by the results of Group II's research, a team of project members developed academic and public outreach programs for instigating and promoting the importance of food/subsistence diversity, TEK and local identity. A series of workshops for the local residents were held in summer 2016 in the upper, middle and lower reaches of the Hei River. Archaeological knowledge about the use of wild food, as well as signatures of human actions on material culture and landscapes, was also incorporated into these workshops. These workshops were planned in consultation with resident researchers and the City Board of Education.

**Other Main Outcomes:** Other notable outcomes of this research group include the [Kyoto 2016 Agroecology Declaration](#), University classes on agroecology at the Univ. of California and Seika Univ., a WAC-8 (the 8<sup>th</sup> World Archaeological Congress) Resolution about resource overexploitation, and transdisciplinary research with Native American tribes. These research activities are being conducted in consultations with members of IHOPE (Integrated History and Futures of People on Earth), and our project is featured as an IHOPE regional case study ([Link](#)).

## 2. MOST NOTABLE OUTPUTS TO DATE

1. Crema, E., Habu, J., Kobayashi, K., Madella, M. 2016,04 Summed Probability Distribution of 14C Dates Suggests Regional Divergences in the Population Dynamics of the Jomon Period in Eastern Japan. PLOS One . DOI:<http://dx.doi.org/10.1371/journal.pone.0154809> (reviewed). <http://dx.doi.org/http://dx.doi.org/10.1371/journal.pone.0154809>
2. Grier, Colin and Bill Angelbeck Tradeoffs in Coast Salish Social Action: Balancing Autonomy, Inequality, and Sustainability. Hegmon, M. (ed.) *The Give and Take and Sustainability: Archaeological and Anthropological Perspectives on Tradeoffs*. Cambridge University Press, New York, NY (in press).
3. Grier, Colin Expanding Notions of Hunter-Gatherer Diversity: Identifying Core Organizational Principles and Practices in Coast Salish Societies of the Northwest Coast of North America. Warren, G. and B. Finlayson (ed.) *Diversity of Hunter-Gatherer Pasts*. Oxbow Press, Oxford, UK (in press).
4. Habu, Junko 2016,09. Food diversity and climate change: Lessons from the Early and Middle Jomon Periods, Japan. *Quarterly of Archaeological Studies* 63(2) :38-50 (in Japanese) (reviewed).
5. Habu, Junko 2015, 10. Mechanisms of long-term culture change and human impacts on the environment: A perspective from historical ecology, with special reference to the Early and Middle Jomon periods of prehistoric Japan. *The Quaternary Research*, 54 :299-310. (in Japanese) (reviewed). [https://www.jstage.jst.go.jp/article/jaqua/54/5/54\\_299/\\_pdf](https://www.jstage.jst.go.jp/article/jaqua/54/5/54_299/_pdf)
6. Habu, Junko, Yumiko Ito and Kaori Adachi (eds.) 2016.03. Excavation Report of the Goshizawa Matsumori No.4 Site, Aomori City. 76pp (in Japanese).
7. Habu, Junko, John W. Olsen and Peter Lape. *Handbook of East and Southeast Asian Archaeology*. Springer, New York, NY (in press).
8. Heron, Carl, Junko Habu, Mio K. Owens, Yumiko Ito, Yvette Eley, Alexandre Lucquin, Anita Randini, Hayley Saul, Cynthia D. Spitteri and Oliver Craig 2016,08. Molecular and isotopic investigations of pottery and 'charred remains' from Sannai Maruyama and Sannai Maruyama No.9, Aomori Prefecture, Japan. *Japanese Journal of Archaeology* 4(1) :29-52 (reviewed). [http://www.jjarchaeology.jp/contents/pdf/vol004/4-1\\_029.pdf](http://www.jjarchaeology.jp/contents/pdf/vol004/4-1_029.pdf)
9. Johnston, Barbara Rose and Takala, Brooke 2016,09 Environmental Disaster and Resilience - The Marshall Islands Story Continues to Unfold. *Cultural Survival Quarterly* 40(3). <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/environmental-disaster-and-resilience-marshall-islands-0>
10. Saeki, Fumiko, Noboru Adachi, Minoru Yoneda, Toshihiko Suzuki, Junmei Sawada, Tsuneo Kakuda, Kotoka Masuyama, Hiromasa Ozaki, Takayuki Omori, Yasuo Hagihara, and Takashi Nara, 2016.05. Analyzing the Final Jomon human remains from the Nonomae shellmound, *Anthropological Science* 124(1): 1-17 (reviewed) (in Japanese).
11. Sasaki, Tsuyoshi. 2016.06. Analysis of the interaction process for the development of an environmental education program in the area damaged by the 2011 tsunami, with a special

reference to the connections between the forest, rivers and the ocean. *Environmental Education* 62 :15-25 (reviewed) (in Japanese).

12. Shinkai, R., Kanno, T., Yamamoto, N. Habu, J. Matsui, A., MacLaren, D, Croes, D. 2015. Excavation of a prehistoric wet site on Triquet Island in British Columbia, Canada. *Archaeological Studies* 62 (3): 16-20 (in Japanese).
13. Thornton, Thomas. F. 2015. The Ideology and Practice of Pacific Herring Cultivation among the Tlingit and Haida. *Human Ecology*, 43(2): 213-223 (reviewed).
14. Yamamoto, Naoto. 2015.03. Sustainable Community in the Late and Final Jomon: A Look at the Tedoru River Alluvial Fan in Ishikawa Prefecture. *The Journal of the Faculty of Letters, Nagoya University. History*, 182: 57-74 (in Japanese).

#### **Book in Preparation with a Contract**

15. Habu, Junko, Tsuyoshi Sasaki and Mayumi Fukunaga (eds.) *Environmental Education and Traditional Ecological Knowledge: Case Studies from the Hei River Valley, Miyako City, 272pp.. Tokai University Press, Tokyo* (in preparation; book contract obtained from the publisher; to be published in March 2018).

### **3. PROJECT ORGANIZATION AND CORE MEMBERS (SEE FULL LIST [HERE](#))**

#### **Group I: *Longue Durée* Group**

Group Leader: Junko Habu

Project Researcher: Kaori Adachi

**Core Sub-Project:** Early-Middle Jomon Archaeology in Northeastern Japan

Core Members: Minoru Yoneda (C/N stable isotope analysis and <sup>14</sup>C dating)  
Hodaka Kawahata & Akihiro Yoshida (Climate change)  
Enrico Crema & Marco Madella (Statistical modelling)  
Carl Heron, Oliver Craig & Kevin Gibbs (residue analysis)  
Oki Nakamura (Site Database)  
Yumiko Ito (paleobotany)  
Simon Kaner & Liliana Janik (Areal Study: Shinano River)  
Naoto Yamamoto (Areal Study: Hokuriku)

#### **Key Comparative Sub-Projects:**

**California:** Kent Lightfoot (Año Nuevo State Park & Point Reyes)

**Northwest Coast:** Colin Grier (Vancouver Islands) & Ken Ames (Columbia River)

**Canadian Arctic:** James Savelle (Growth and decline of the Thule Culture)

**Kurils/Eastern Hokkaido:** Ben Fitzhugh & John Krigbaum (Pb/Sr isotope analysis)

#### **Group II: Contemporary Society Group**

Group Leader: Aoi Hosoya

Project Researcher: Rika Shinkai

**Core Sub-Project: Rural Communities in Northeastern Japan**

Core Members: Mayumi Fukunaga, Rika Shinkai and Junko Habu (Hei River, Miyako City)  
Yumiko Ito & William Balée (Joboji)  
Kazunobu Ikeya (Yamada & Otsuchi Towns, Iwate Pref.)  
Satsuki Takahashi (Soma and Iwaki Cities, Fukushima Pref.)  
Tomiko Yamaguchi, Yasuo Goto & Nobuyo Goto (Fukushima Pref.)

#### **Key Comparative Sub-Projects:**

**California:** Rob Cuthrell, Aoi Hosoya (Native tribes) & Tomiko Yamaguchi (organic farmers)

**Alaska:** Thomas Thornton & Shingo Hamada (Herring fishing & the Tlingit tribe)

**Marshall Islands:** Barbara Rose Johnston (Comparison with Fukushima)

#### **Group III. Implementation, Outreach and Policy Proposal Group**

Group co-leaders: Aoi Hosoya and Junko Habu

Project Researcher: Rika Shinkai

**Core Sub-Project: Rural Communities and Agroecology in Northeastern Japan**

Core Members: Tsuyoshi Sasaki, Rika Shinkai & Junko Habu (Hei River, Miyako City)  
Daisuke Naito (Shiraoi and Nibutani, Hokkaido)  
Ichiro Motono (Organic farming & producer-consumer networks)

#### **Key Comparative Sub-Projects:**

**California: Agroecology:** Miguel Altieri & Fritjof Capra

**California: Phytoremediation:** Celine Pallud & Sarick Matzen

**California: Collaboration with Native Tribes:** Rob Cuthrell

#### 4. FIGURES AND SUPPLEMENTARY MATERIALS

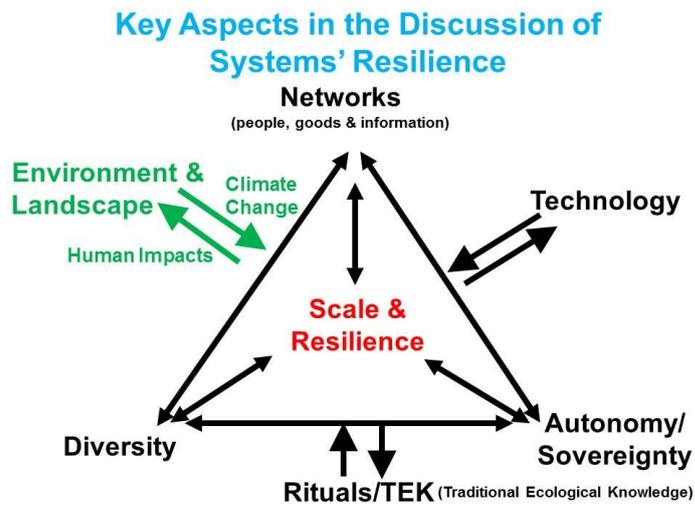


Figure 1. Key Aspects in the Discussion of Systems' Resilience