

Environmental humanities: a long-term local history approach to living spaces

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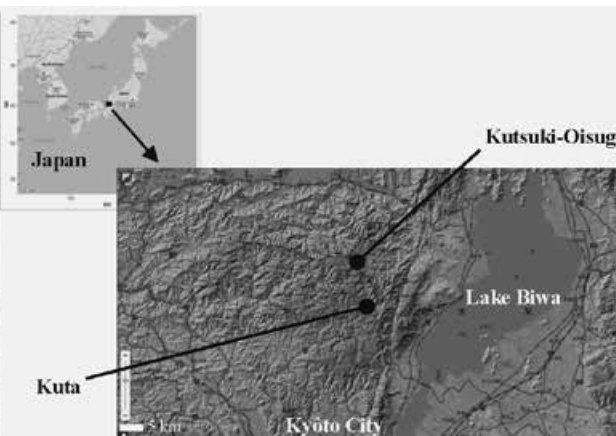
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I. Introduction: changing cultural landscapes in Japan

At a time when we urgently need to respond to climate change, the most important thing is to make the most of the power and resilience of nature. However, Japan's current situation is not heading in that direction. Japan's cultural landscape is in a period of rapid reorganization. The population decline is especially pronounced in mountainous and remote areas: many fields have been abandoned, forests are no longer cared for, and the old plantation landscapes are a thing of the past. Of course, there are still some fields that have survived, and agriculture, forestry, and fisheries are still being maintained. However, small-scale farmland in mountainous areas will remain abandoned if no one lives there as the population ages. Rural landscapes that have been in existence since medieval or even ancient times are now becoming a thing of the past.



Photo 1. An abandoned house in Kutsuki-Oisugi
(Taken by S. Murayama on August 15, 2017)



Map 1. Kuta and Kutsuki-Oisugi in Japan

This map is a reproduction of the digital elevation map by the Geospatial Information Authority of Japan.



Photo 2. Abandoned rice fields in Kutsuki-Oisugi
(Taken by S. Murayama on August 15, 2017)



Photo 3. Well-reserved rice fields in Kuta
(Taken by Murayama on August 16, 2015)

This essay is based on my recently published article regarding a farming village near Kyôto City. It is a long-term local history of the village of Kuta from medieval times to the present day. Kuta, located about 40 km from the center of Kyôto, still retains its traditional paddy rice farming landscape, but in Kutsuki-Oisugi, a village more than ten kilometers over a several passes from the center of Kuta, most of the paddy fields have been abandoned in recent years. Each of these villages has a long history, but in the case of Kuta, even though the village is mostly populated by elderly people, agriculture was maintained because their relatives live in Kyoto City. In the case of Kutsuki-Oisugi, it was necessary to travel along narrow mountain roads, and the distance from the city seems to have been decisive.

In Japan, a country that relies on foreign countries for most of its basic resources, the living spaces that existed when the country was not involved in the global economy are likely to disappear. Most of the old living spaces relied on the capability of organic economies of the land inherited from generations of ancestors. Even today, there is still the customary ritual of welcoming the ancestors in the middle of August. Nevertheless, can we really let everything disappear? Let me introduce you to the writings of Amartya Sen, Nobel laureate in economics:

“The demise of old ways of living can cause anguish, and a deep sense of loss. It is a little like the extinction of older species of animals. This is an issue of some seriousness, but it is up to the society to determine what, if anything, it wants to do to reserve old forms of living, perhaps even at significant economic costs.” (Sen, 1999, p. 241.)

There are the big differences between Asia and Europe in living spaces due to the distribution of precipitation and temperature. The spread of human settlements differs greatly. In Asia, the living spaces are composed of a wide range of regions, from low to high temperatures and low to high precipitation. In Asia, only a small part of Japan and other countries has a climate pattern like that of Europe. Japan has a climate pattern that is extremely favorable for paddy rice cultivation, with relatively high temperatures and moderately high precipitation from around May to October. It would be a shame if we were to abandon these conditions for the most part.

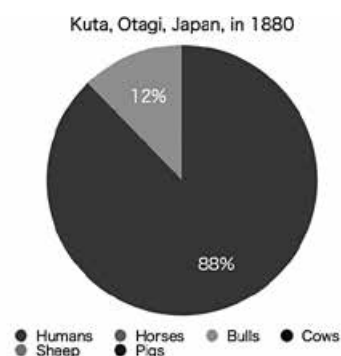


Figure 1a
Source: *Kyôto-Fu Chishi*

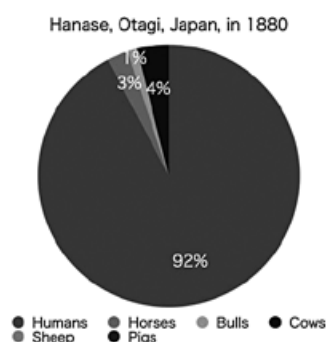


Figure 1b
Source: *Kyôto-Fu Chishi*

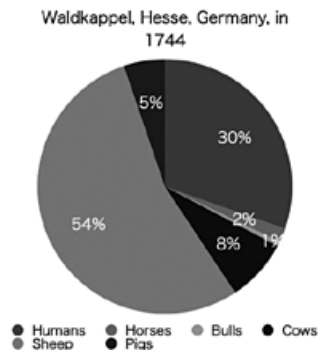


Figure 1c

Source: *Waldkappel 1744*, bearbeitet von Heinrich Albrecht, Hessische Ortsbeschreibungen 7, Marburg/Lahn und Witzhausen: Verlag Trautvetter und Fischer Nachf.

Table 1: Number of humans and livestock in Amakusa

Year	1768	in%	1868	in%
Humans	97,336	95.5%	157,677	92.6%
Horses	4,385	4.3%	9,184	5.4%
Bulls and Cows	226	0.2%	3,418	2.0%
Sheep	0	0.0%	0	0.0%
Pigs	0	0.0%	0	0.0%
	101,947	100.0%	170,279	100.0%

Source:

- Year 1768: Amakusa-Gun Meisai-Chō [A detailed account book of Amakusa County], Ueda House Archive.

- Year 1868: Amakusa-Gun Mura-Mura Taka Kosû Jinkô sonohoka Torishirabe-Chō [An investigation report of productivity, household numbers, population of villages in Amakusa County, Nagasaki Museum of History and Culture.

In addition, even if it is not only due to these climatic patterns, a comparison of pre-modern villages in Japan and Germany shows a very clear difference in the size of animal populations, including humans. It may come as some surprise, but both humans and livestock are counted here without distinction. In Japan, the number of humans is relatively overwhelming (88% of an agricultural village, Kuta (population of humans: 480) and 92% of a forestry village, Hanase (population of humans: 775), for a comparison) (Figure 1a/b), while in Waldkappel (population of humans: 758) in Hesse, Germany, the number of sheep is much higher (54%) as a percentage of humans in 30% (Figure 1c). Around 1880, only cattle were recorded in Kuta in terms of livestock. The fact that only bulls were recorded in Kuta is also unique compared to other villages, and it is highly likely that the cattle were used for farming and the main labor force in agriculture.

The villages around Kyôto are referred to in *Kôkoku Chishi* (The Imperial Gazetteer: Topography of Imperial Kingdom), which was compiled and submitted to the government by the Kyôto Prefecture and covered the eight counties of Yamashiro Country, an administrative unit of early modern Japan. The data for Otagi County are an example of remaining manuscripts. Unfortunately, the exact year cannot be traced for the data for Otagi County, and thus, I speculate that they are from the early Meiji period, around 1880. The present research used the data of 56 villages derived from the documents regarding the *Kyôto-Fu Chishi* (topography of Kyôto Prefecture) that are archived by the Kyôto Prefectural Library and Archives. In Hanase, also belonging to Otagi County, horses were also kept. This record is from around 1880, but the condition of the animals before that time is not considered to have changed much. In Amakusa County, Kyûshû, in southwestern Japan, where the human population increased from less than 100,000 to more than 150,000 between 1768 and 1868, the percentage of humans was still 95.5% and 92.6%, respectively (Table 1). This kind of population growth was rare in early modern Japan, but we can assume that the proportion of all domestic animals in the population did not change significantly. While it is not possible to examine these differences in detail here, I will now briefly introduce some of the issues that have emerged from a long-term local history analysis of the village of Kuta, Japan.

II. Historical evidence derived from a long-term local history of Kuta, Kyô-Otagi, Japan

Let me begin by setting up the central question for this essay's discussion: 1. The world, with its vastly different climatic patterns and natural conditions, now seems to be operating under a unified economic system, but is that really the right choice? 2. Can artificial intelligence help the people who live at a place to maintain their living spaces? Although we are already using this term, let me briefly explain the concept of living spaces. "Living Spaces" is a term devised by my research group to represent a holistic spatial concept that includes all life forms living in a certain environment. It embraces the spatial relationship and organic interactions between humans and nature (Murayama and Nakamura, 2021, pp. 117-8 and Notes 22, p. 119).

Kuta first appeared in historical documents in Kôhei 7 (1064), when it was described as a temple territory of the Hôjô-Ji Temple in Kyôto. Furthermore, in Heiji 1 (1159), Kuta had 15 chô (1 chô = about 10,000 square meters) of paddy fields, which were under the jurisdiction of the temple, whereas the development of other fields was free. There was also a "soma" mountain, which was positioned as a soma site for the repair of Byôdô-In Temple and Hôjô-Ji Temple. The word soma means timber forest. Twelfth-century sources on the taxes shouldered by the inhabitants of Kuta show us a unique but possible story; they were entrusted with the preservation of majestic temples, such as Byôdô-In and Hôjô-Ji, and at the same time, were given the freedom to develop the land. In other words, they were guaranteed, in exchange for their contribution in maintaining cultural buildings, the economic freedom to survive.

This can be considered the starting point of village autonomy, or a communal village system in Kuta, which was a multidimensional regional representation that existed over a long term, and simultaneously the origin of the accelerated administrative power that reached its heights in World War I (the "administrative revolution" of John Hicks) (Hicks, 1969).

A land survey ledger, Kenchichô, was compiled in Keichô 7 (1602), the year before the start of the Edo period (1603). At this time, Kuta was made up of five villages: Nakazaichi, Kami, Kawai, Shimo, and Miyanotani. The land survey of 1602 provides a clue to the birth of the territorial fiscal state, which determined all the village boundaries in Japan. The total tax amount for these five villages was calculated to be 389.65 koku (amount of koku = putative rice yield: one koku was enough yield to feed one person for one year in the Tokugawa period). The *muradaka* (village productivity) was almost unchanged at the end of the Tokugawa period, more than 260 years later, amounting to 391.21 koku.

Some villages during the industrialization in Japan specialized in forestry and distribution and formed new supply areas of living resources. Kuta became one of the multiple suppliers of firewood and charcoal, without experiencing any decisive change; as a result, it appears to have maintained the rural landscape of the Edo period (early modern times). Until the 1970s, almost every farmer

in Kuta kept a bull for cultivation, and the women's memories of Kuta, compiled in 1993, tell of the life in Kuta and their diligence.

Fumi Shimizu (born in the 1930s) "A Mountain of Memories" (Murayama and Nakamura, 2021, pp. 116-7.):

When the world awoke from its long winter sleep and the nightingale began to sing, everyone became busy in the rice fields, in the crop fields and in the mountains. I would go into the woods to collect tree branches from very early in the morning to help make charcoal and to prepare bundles of firewood. I would till the land, getting blisters on my hand until the end of April. They were very challenging days.

Now that I think of it, the one or two days a month that we got off were a long time coming for the young bride. When we had finally finished planting rice in the wind and rain, the next day would be another early morning starting with cutting grass for the bull [draft cattle: the house cattle played an important role in farming, so they were well cared for and fed. People used to say that one looks at the bull and you could see what a hard worker the wife was.]. I would spend the afternoons cutting grass in the mountains. After a while, I would go into the barn [which was often a part of the main house] to take the bull dung out. Day after day, the hot weather would continue. As the weather got a bit cooler, we would start reaping the rice. When it rained, I would gather chestnuts and horse chestnuts, so there was no time for me to rest my shoulders. On sunny days, I would spend the evening carrying the harvested rice under the stars.

There were many hardships, such as hanging the rice on wooden racks to dry and dealing with the elderly. I would stay up until very late each night threshing the rice. This work would go on and on until the end of autumn, in November. Then, we would begin preparing for the winter, gathering firewood, and carrying charcoal in a bicycle-drawn cart to Ume-no-ki (in the neighboring prefecture Shiga).

Since the mid-1970s, cultivators, tractors, and power threshers were introduced; therefore, the rice harvested by combine harvesters could be hulled and packed into bags on the spot. The month-long process of hanging rice on wooden racks to dry could now be done in a single night. Until the 1960s, the traditional role of rice, wood, and charcoal suppliers did not change so dramatically. Today, the mountainous living spaces are only made use of for leisure facilities, such as campsites, and the processing of wild vegetables. In order to save living spaces that are losing their countless productive realities, which are not recognized as a grand heritage like those featured in the Globally Important Agricultural Heritage Systems, it is necessary to have regionally original representations that reflect the realities of each region, such as those seen in Kuta's past.

III. Artificial intelligence for environmental humanities?

It is thought that humanity has faced environmental problems at every stage of its history since ancient times. In other words, if we do not consider environmental problems to be unique to our time, there are a variety of relationships between humankind and nature that have always been problematic, and when faced with these environmental problems, how do we make decisions, in

what contexts do we make decisions, in what relationships do we make decisions? What kind of social institutions do those decision-making processes produce, or do they result in economic stagnation, decline, or constant economic growth? Or can we find optimal solutions to, for example, contemporary energy problems?

Is one universal system, such as an economic system, the right choice for a climatically and ecologically diverse world? The evidence from a long-term local history of Kuta is as follows: in medieval times, free environmental decision-making of the inhabitants; in early modern times, proper fiscal management and austerity; in modern times, sustained economic growth that continues to produce the weak.

After nationwide capitalist economic and public policies reorganize living spaces in every corner of Japan, what is crucial, however, is that the long-term history of locations such as Kuta may end sooner or later. A new multidimensional regional representation in the future will be needed as an alternative to maintain local living spaces. Can artificial intelligence (AI) help the people who live there to maintain their living spaces? All tools should be useful, but the question is which kind of living spaces are to be chosen. Could AI help us for such a decision-making? How does AI directly relate to future economic or public policy, which has dramatically changed living spaces in Japan?

The time has come to fundamentally rethink economic policy, the economy of local living spaces, and administrative power. The question is whether it is possible to minimize the loss of local living spaces by creating new multidimensional representations of the region through the mobilization of experience, knowledge, and new science and technology, including AI. It may be that I am assuming a task that is impossible and improbable, such as the restoration of the local economy defined by the environment: the “environmentally local economy.” However, it is certain that the current economy is based on a more insecure foundation than, for example, that of Kuta in medieval times, which was of 500 years’ duration.

This is because we have lost sight of the local organic economy. In this respect, the historical data that can be extracted from the most spectacular experimental sites of the past, digitized, and quantified, may become a treasure trove for future AI applications. What is the meaning of freedom in human decision-making in an administratively highly controlled society? Is the organic economy, which uses photosynthesis as its core to generate sources of energy resources, limited only to the supply of food resources? Can AI have any effective relationship with the fundamental problem of human reproduction in a hyper professionalized society of the “division of labor”?

Kuta’s case study shows how the sustainability of human life forms as a group is possible over a long period of time in specific local living spaces. Viewed from the perspective of long-term local history and economy in Japan, Kuta’s inhabitants have experienced the long medieval leap in transition to the tragic 19th century in a prolonged term:

“The industrial revolution is usually depicted as a success story... however, the industrial revolution may come to be regarded not as a beneficial event which liberated mankind from the shackles which limited growth possibilities in all organic economies but as the precursor of an overwhelming tragedy—assuming that there are still survivors to tell the tale.” (Wrigley, J. E., 2016, pp. 204-5.)

IV. Discussions on environmentally local “economy”

The era of workers marginalized by capital is not over. The situation is even more serious than in the 19th century when Marx and Engels lived. Climate change is becoming more and more apparent, and extreme weather events are becoming an everyday occurrence. If we divide nature into “water and air” (Nature A) and “land and resources” (Nature B) (see Figure 2/3), it is easier to understand the current climate crisis. The former, water and air, which should be considered public goods, are creating a critical climate situation for land and resources, while the latter, land and resources, because of the enforcement of property rights, are increasingly thrown into the movement of giant capital, which continues to reproduce a climate crisis through the emission of greenhouse gases. In other words, if we think of the problem of workers’ alienation as the alienation of human beings from nature in this sense, it has become an ecological crisis common to almost all human beings.

There are two combinations of axes embedded in the following diagram (Figure 2). The first is a combination of the vertical axis of social technologies and science and technology, and the horizontal axis of the living spaces of the place (local living spaces) and the multidimensional regional representation by humans. The other is a combination of diagonal axes: The first axis of nature A of water and air and nature B of land and resources, and the second axis of natural sciences and the humanities and social sciences. People and all living creatures that live at the intersection of these axes, and a new practical-research group, called HAELE (to be explained in what follows) has its place there. The local living spaces are the material world, and the multidimensional regional representation is the cognitive world of human beings.

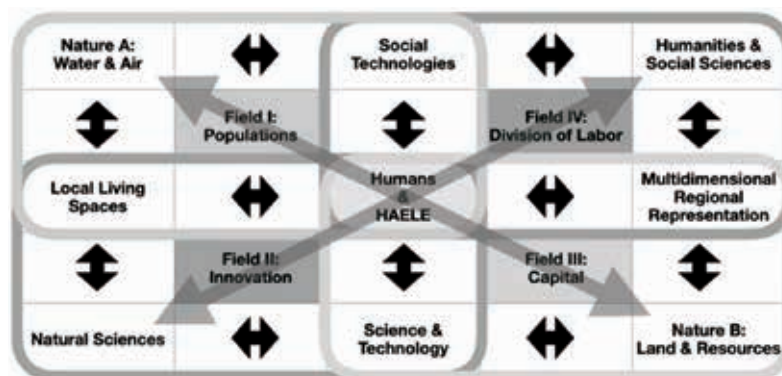


Figure 2. Place and aims of the HAELE among environmental, academic, and economic fields

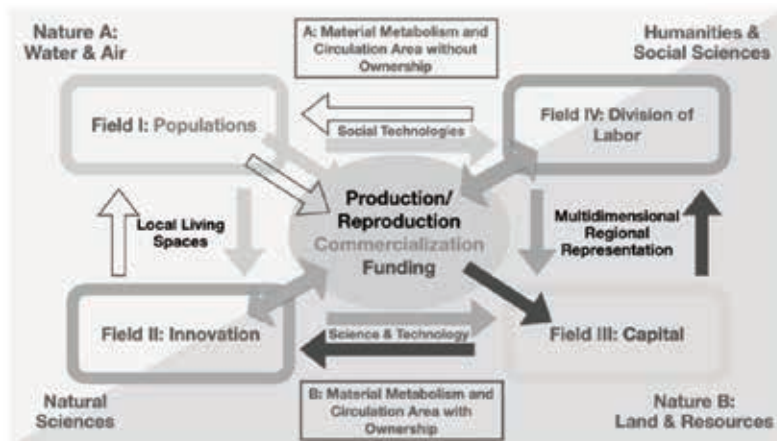


Figure 3. Two kinds of economic growth in pre-modern Eurasia: Nature A (water and air) and Nature B (land and resources)

The global economy, which is self-propagating, has made it almost impossible for humanity to produce in precise response to nature, and we continue to look to the fiscal stimulus generated by the collective selfishness of nationalism, which divides the global environment. A major part of the tax money taken from the people is spent on economic growth. However, the global economy, driven by the old-fashioned belief that economic growth enriches the people, will not be able to stop the tragedy of global warming. This is because it was the global economy of the Industrial Revolution that ended the era of the organic economy, which was unstable and at the mercy of nature, and created the geological age of the Anthropocene, which devours the fossil and mineral resources of the earth.

The Industrial Revolution was a regional economic movement that started in Britain, but its essence was the accelerated utilization of the earth's resources. It was a movement that quickly spread to neighboring countries and, in the long run, to the entire globe. As a result, humans, who can only sustain life through the medium of money, have been forced to live through an era of climate change that has destabilized the life-supporting roots of water and air. The nature in the lower right of the above diagram is land and resources, but the global economy began to erode the nature of water and air in the upper left, and humanity finally entered an era of population decline that would lead to its own extinction.

The setting of the four fields is based on the four factors of modern economic growth: capital, market, population size of humans, and technological progress and innovation. Originally, Joel Mokyr examined this typology of economic growth, which was reexamined by O. Saito especially for the division of labor in pre-modern times, as a Smithian growth (Saito, O., 2008, pp. 47-78). In Figure 2, these four fields of the factors of economic growth can be further divided into two categories of nature other than living organisms, creating four more fields, and then eight fields in total, which can encompass more issues than expected. This will depend on future discussions.

The future of the human species depends on how we rethink capital-led economic growth (Field

III) in the lower right (Figure 3) (See Moore, 2016, and Saito. K., 2016). I believe that the era of de-economic growth calls for a revolutionary shift that is linked to other factors of economic growth, such as technological innovation and division of labor. It is safe to say that we have entered an era in which we must move away from the lower right field of capital and address not only the population of the human species, but also the populations of all life forms. Ester Boserup's argument that population pressure has given rise to agricultural innovation needs to be extended far beyond the matter of humans' population. The division of labor (Field IV), in line with Adam Smith, and technological innovation (Field II), as discussed by Joseph Schumpeter, are also considered factors that generate economic growth.

I believe that the rethinking in this essay of ecologically diverse populations and humans' reproduction based on specific localities, e.g., local living spaces such as Kuta's, will lead to a new review of the "economy," which might lead to a future of an AI-assisted, human-centered sustainability of local living spaces. There is also a need to maintain "regional" autonomy, which can put a stop to the excessive global economy that is being led by capital. To achieve this, it will be crucial to construct a new multidimensional "regional" representation (see the right center of Figure 2/3) that takes both natural environments (A and B) and the relation between capital and division of labor into consideration. For this purpose, coordinated with the International Consortium for Earth and Development Sciences at Kagawa University, the Historical Association for Environmentally Local Economy (HAELE) (http://dlpweb.ed.kagawa-u.ac.jp/main/?page_id=462) was launched by the author and his research and educational colleagues on November 20, 2021.

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