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“Social Opium” as a Social Mechanism
 ——A Sociological Analysis of the Vicissitudes
 of the Fukushima Power Plant-based Town¹⁾——

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Preface

People seek for the better, whatever that “better” means. Rarely do they seek for the worse, at least not on their conscious level. They want to enjoy amenities and a higher quality of life, material or otherwise. A similar inclination holds at the level of local government as well as at the national level.

In 2010, the Shanghai World Expo took place, whose slogan was “better city, better life.” In 2011, the Chinese government formed a new five-year plan (2011–2015) aimed at achieving the better life. Almost all countries have always sought a better world (Popper, 1984).

However, seeking for the better may result in the worse, perhaps as an unintended consequence of social action (Boudon, 1982) at an individual or collective level.

The present paper attempts to formulate such a social mechanism,²⁾ which I call “social opium,” by referring to the local township government located adjacent to the Fukushima Nuclear Power Plant that was damaged severely by a massive earthquake and ensuing tsunami on March 11, 2011.

Key words: Unintended consequences of social action, social mechanism, missed opportunity, social opium

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- 2) For the general understanding of the term “social mechanism,” see Hedström and Swedberg (1998), Hedström (2005), Gross (2009) and Manzo (2010).

I. General View of Social Opium

Figure 1 represents a general view of a social mechanism of what I would call social opium.

F-town and O-town, which until 1960 were economically deprived areas due to their meager revenue from farming and salt panning, decided to invite the presence of a nuclear power plant. These towns petitioned the Governor of Fukushima Prefecture and TEPCO (Tokyo Electric Power Corporation) to construct plants there, at a time when Japanese society in general enjoyed high economic growth but rural areas including F-town and O-town were relatively underdeveloped, and perhaps severely frustrated. In Figure 1, G stands for the government, central and local, and E stands for an electronic company, TEPCO in this case.

As one of the old residents of F-town recalled, “working at the nuclear power plant [would be risky, but it] would be much better than working as a migrant worker [in urban areas, which was hard work for less pay]” (*Kobe Shimbun*, May 28, 2011, p.27). “Working as a migrant worker” [= *dekasegi* in Japanese] meant that living in the rural area forced people to go elsewhere to seek work, since it was really impoverished because of a paucity of labor opportunities and due to disadvantaged labor conditions (Watanabe and Haneda, 1977). The Fukushima First Nuclear Plant was successfully completed owing to the close-knit network among the prefectural governor and the central government, as well as others, and began operating in 1971 (Kainuma, 2011: Ch.4).

In 1974, the so-called *dengen-sanpo* (three laws related to power supply) to facilitate electricity power plants were enacted, as a result of which a large amount of subsidies poured into those towns during the period for construction of the nuclear power plants. The increase of revenue owing to the subsidies helped to a

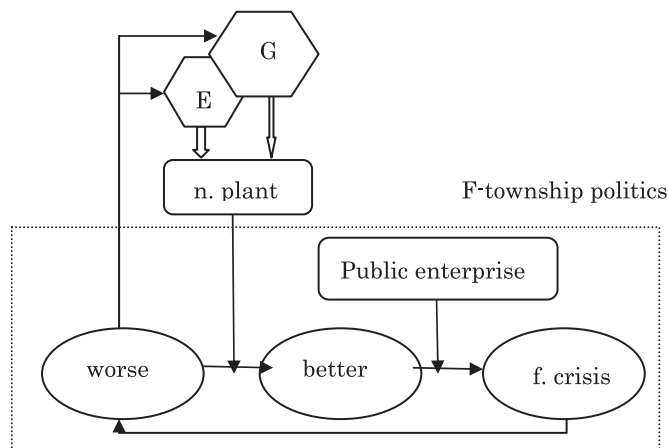


Figure 1 General Overview of Social Opium

great degree to ameliorate the financial situation of F-town, at least temporarily. F-town received, it is said, roughly 3,300 million yen by the end of the 1987 fiscal year (Hagami, 2011).

According to census data, F-town and O-town adjacent to the Fukushima Nuclear Power Plant were almost the only towns (among more than 80 towns and villages within Fukushima Prefecture) whose population started increasing during the period of 1965–1970, which implied that people kept migrating into those towns for the construction of the plants. The first plant began to be constructed in the year 1967, followed by another five plants in the succeeding years, and started operations in 1971–1979.

F-town invested those subsidies into 182 public enterprises such as construction of integrated playgrounds for the residents, a public library, and road construction whose maintenance cost turned out to be exorbitant. However, the subsidies as such were temporary and provisional in nature and the property tax revenue decreased drastically after the completion of the plants.

The population of F-town hit its prime in 1985, with about 8,200 people, but started decreasing thereafter. It plunged into deficit financing in 1990 and the one-time super-rich town soon became one of the poorest towns in Japan (Hagami, *ibid.*).

To sum up, F-town became better temporarily but then entered a financial crisis, which made the town even worse than before. Then, the town became eager to invite nuclear power plants again in order to pursue the better as if it were a person who was addicted to opium.

As a matter of fact, the assembly of F-town petitioned TEPCO and Fukushima Prefecture to build another two nuclear plants in the year 1991. TEPCO put that idea on its formal agenda in 1993, but the situation did not allow the township to go further. Finally, TEPCO discarded that idea in the wake of the major earthquake and tsunami, which hit the area in March 2011. F-town was destroyed and much of it was completely swept away. Hence, their “dream” vanished.

All residents who had survived were forced to move out of F-town and live far away from their home. The place where F-town was located is now sealed off and nobody is allowed to live there; F-town turned out to be a devastated and deserted “Chernobyl” (Hirokawa, 1999). F-town has undergone the worst after experiencing the succeeding processes of “social opium,” which shall be clarified in the following.

II. The Ashbyan Model Reused: Neo-Social Organismic Theory

1. Key Ideas and Notions.

In 1952, W. Ross Ashby depicted the systems theory scheme and cybernetics paradigm under the title of “design for a brain,” which he used to represent and analyze a biological system and a machine whose mechanisms are characterized by self-coordination and adaptability via the learning process. He repeatedly used an exemplar where a kitten first approaches a fire and its reactions are unpredictable and usually inappropriate; but then the kitten gradually learns for the better by adapting to the environment.

Indeed, Ashby restrains himself to a model of a machine and a brain in that literature; hence, his model apparently cannot be directly applied to a social system, which is our main concern here. However, he attempted to elucidate the very basic logic of the pure mechanism of a system which behaves mechanistically and adaptively (Ashby, 1952: Preface) by rigorously depending upon a mathematical representation of a mechanism in which he develops the concepts and ideas; it seems, therefore, that his model can even be applied to a social system as well since a social system is also adaptively functioning in relation to its environment (Parsons, 1951).

The learning process usually leads a system, whether biological or a machine, to the state of “the better” through an adaptation, but “it may be noted that activity, if inco-ordinated, tends merely to the system’s destruction” (*ibid*, p.5). Likewise, a social system may end up in “self-destruction,” or, simply collapse unless it successfully manages to coordinate parts of its entire system to adapt itself to its environment.

Social organismic theory dates back to the early stages of sociology, that is, Comte and Spencer, and would naturally be criticized because of its implicit and sometimes naïve assumptions that a society can be represented as if it were an ordinary animal. Despite these criticisms, the theory still has some uses even when we analyze the contemporary social phenomenon we are facing.

A social organismic theory is useful since it simplifies the situation as the subject of our research, thereby highlighting the underlying essential mechanism. Indeed, we could make a system under study analytically more complex by distinguishing levels of reference of a system, or incorporating the idea of “concatenation of mechanisms” (Gambetta, 1998), but the complication would do little unless the implications derived from a model in its broad sense become clear-cut.

For example, Kainuma (2011) succeeds in a sociological analysis of how communities involving nuclear power plants in Japan were formed during the past

several decades. It is indeed one way to characterize the historical development of “nuclear power communities,” but is so complicated that we should have a more clear-cut analysis that allows us to encompass the whole story in a succinct way.

He points out that the situation under his analysis makes it very hard to distinguish those who are “victims” from those who are responsible for the disasters (Kainuma, 2011, p.15). “Those who are subject to harm might simultaneously be among those who brought the harm” (*ibid*, p.15). Furthermore, people are often unaware of their “positionality” by which they can locate themselves in recognizing the objective social role they are taking.

In such a situation of reality, we had better take a wide angle view of the social scene so that we can grasp the entire view more clearly and succinctly. As Simmel pointed out earlier, “if we observe people within a definite circle *closely* enough, we could see individuals’ countenances clearly to see the differences among them, but if you observe them from a far distance, you acquire the image of a *society* by suppressing the individuals’ minutiae and distinctions, which has its own form and color . . . It is nothing but a difference of goals of scientific recognition that determine the adequate distance between the object and ourselves” (Simmel, 1917, pp.20–21). For our own purpose of recognizing and analyzing “communities involving nuclear power plants,” the wide angle lens method would be justified to render the social mechanism clearer.

Then, we want to re-use the Ashbyan model to re-formulate the entire processes depicted in Figure 2, which is copied from Ashby (1952, p.83).

Here are the set of ideas and concepts to describe a machine or a biological system. Given an organism, shown as R (=reacting part) in the figure representing a system, the environment is defined as those variables whose changes affect the organism, and those variables that are changed by the organism’s behavior (*ibid*, p.36). The reacting part and its environment interact with each other over time, which may well be described as “feedback.” The organism and its environment are to be treated as a single whole system, although the dividing line between “organism” and “environment” becomes partly conceptual, and to that extent arbitrary (*ibid*, p.40).

Every species has a number of variables closely related to survival and linked dynamically so that marked changes in any one variable lead sooner or later to marked changes in the others. These important and closely linked variables will be referred to as the “essential variables” of the animal (*ibid*, p.42). For example, if the amount of oxygen in the blood exceeds

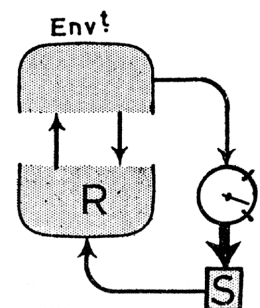


Figure 2 The Ashbyan Model (Ashby, 1952, p.83)

the normal limits, then that organism would likely die almost at once. If the amount of infection in the peritoneal cavity exceeds the acceptable limit, the organism should be regarded as seriously, but not necessarily fatally, ill. That is, there are some variations among the essential variables in terms of the closeness or urgency of their relations to lethality (*ibid*, p.43).

The essential variables are represented collectively by a dial with a pointer as in the figure, and with two limit-marks, to emphasize that what matters about the essential variables is whether the value remains within physiological limits. The pointer has an immediate effect upon S, some parameters of which would have an immediate effect on R. A “parameter” is a variable that is not included in a system. Since a variable denotes a measurable quantity that at every instant has a definite numerical value, a parameter also has values (*ibid*, p.14, p.71).

For explication of these concepts, Ashby uses the example of the common observation that the burned kitten dreads the fire (*ibid*, p.84), as follows.

- (i) With the essential variable *within* their limits, the overt behavior of R is such as is consequent on the parameters having values S 1;
- (ii) With the essential variables sent *outside* the limits (that is, if the kitten is burnt), the overt behavior of R is such as is consequent on the parameters having values S2.

Put differently, the two arrays of different values of the essential variables have led to different values at S; there is, therefore, an immediate effect from the essential variables on the parameters S.

Note that there are two-way feedback loops here as in the figure. The first loop consists of the ordinary input giving the organism a form of adaptive behavior, which maintains the essential variables within physiological limits, while the second feedback goes through the essential variables providing information about whether the essential variables are or are not driven outside the normal limits (*ibid*, p.58, p.83).

2. An Application to F-town Experiences

Let us take F-town as if it were an organism, say, a kitten. It interacts with its environment, that is, the external political power like the central government, which has initiated the advancement of nuclear power policy; TEPCO; and the specific nuclear power plants within Fukushima Prefecture. F-town and its environment are regarded as forming a whole system theoretically.

F-town as R (= reacting part) interacts with its environment to change from the worse to the better, to establish a nuclear power plant, which had substantive effects

upon a set of variables within both the town and its environment.

The outcome of a series of interactions between F-town and its environment and of internal politics and actions such as the construction of public enterprises was reflected by the pointer of essential variables, implying the critical value of some parameter S in the form of financially lethal deterioration. Perhaps, essential values would consist of a declining population, a financial crisis, and others.

F-town, after having received a warning from some parameter S, even attempted to invite another two nuclear power plants during the process of interaction with its environment in order to survive as an organism. The problem was that “the worse at t + 1” was much worse than “the worse at t” while “the better at t + 1” should be much better than “the better at t.”

However, before its project became successful, F-town as well as the plants were devastatingly destroyed by the big quake and tsunami, that is, a set of factors external to a system, and the ensuing nuclear power plant accidents caused by the hydrogen explosion, which showed the possibly worst value of parameter S. The reality was that the accidents became serious and still seem to be beyond control. People in F-town had to abandon it, and discard the radioactively contaminated belongings in their home town to survive. A town office also had to evacuate to a place located far away from F-town, which has become like one of the villages that disappeared in Chernobyl (Hirokawa, 1999). F-town as a geographically determined system just about self-destructed.

III. Social Opium as a Social Mechanism

We have now come to the position where we could determine more explicitly the nature of “social opium as a social mechanism.” The following provides a preliminary sketch to construct a family of formal models in the future to elucidate the social mechanism of social opium, whose point shall be graphically captured by two figures. Figure 3 shows the changes of population (line) and “financial power

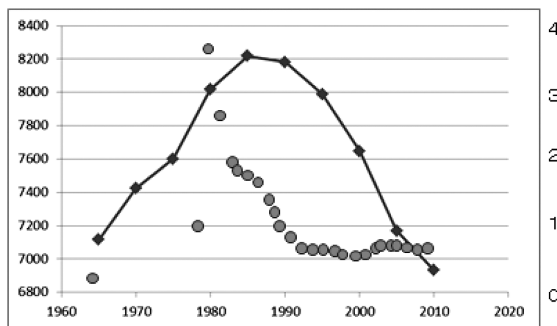


Figure 3 Changes of Population and Financial Power Index (=FPI)

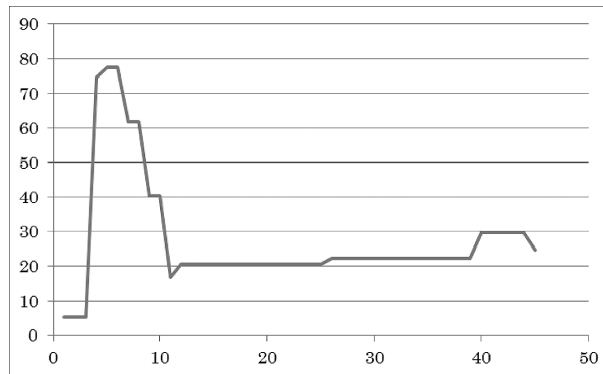


Figure 4 Expected Subsidies (100 million yen)

Source: *Shukan Diamond*, May 21, 2011, p.21.

index (=FPI)” (dot) of F-town. Figure 4 represents the expected amount of subsidies to a town when it decided to invite a nuclear power plant.

Note that FPI is computed by expected tax income divided by the standardized financial amount needed; so if it is greater than unity, it implies financial stability and allowance, whereas if it is less than unity, it implies financial crisis at that level of local governance. Although FPI is incomplete in the figure because of unavailability of data, we might be able to picture a “(reversed) ice-cream-cone-shaped mountain” with its top around 1980. The population change is hat-shaped with its prime around 1980–1985. These two figures obviously reflect the construction of the Fukushima First Nuclear Power Plant (having started construction in 1967 and operation in 1971), which brought a large amount of subsidies to the town.

Figure 4 represents a “model case” subsidy scheme under the law and a going institution. The x-axis shows the length of years that elapsed since the beginning of environmental assessment of the construction site after the formal decision was made to construct a power plant. A subsidy is given for the assessment for the first three years, then for the construction of a plant before the operation. All in all, a considerable amount of subsidy will be given for the first ten years, then declines drastically afterwards.

A glimpse of Figure 3 easily tells us that the first 16 years (1964–1980) were the period of population growth absorbing migrant workers, and of prosperity in terms of FPI. Obviously, the prosperity was attained owing to the subsidy provided in return for the acceptance of a nuclear power plant. Afterwards, F-town fell into a decline never to rise again. Recall that it was in 1991 that the town assembly resolved to invite another two nuclear power plants to get out from the “worse” and alleviate the financial crisis.

Thus, the whole process can be divided into two stages of feedback loop as

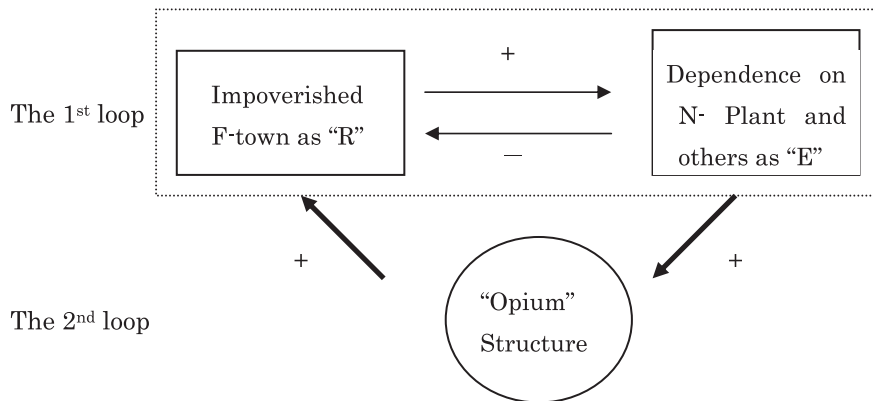


Figure 5 Functional Feedback Relationship between Reactor and Environment

suggested by Ashby above. The first loop consists of the process where the normal negative feedback functioned between the impoverished F-town and its environment involving a nuclear power plant, which covers the first decade. However, during the second loop, the provision and control of subsidies formed a built-in “opium” structure in an insidious but irresistible manner, which is characterized by a marked decline of revenue including property tax from nuclear plants and, perhaps, the rise of the standardized financial amount in need. Here the status of impoverished, once ameliorated during the first loop, made itself even worse than before as reflected by consecutive critical figures of FPI during the second loop. Figure 5 summarizes the two loops.

Ashby was mainly interested in a stable (or ultra-stable) system where the essential variables were kept within normal limits, that is, an adaptive system. In other words, his main interest lay in a self-regulating and equilibrating system. His theoretical framework itself, however, allows for a system that is subject to self-destruction or the case where essential variables exceed normal limits as briefly mentioned above.

Maruyama (1963) proposed earlier the notion of “The Second Feedback” by referring to the possibility of deviation-amplifying mutual causal processes called “morphogenesis.” The development of a city in an agricultural plain is one such example, where some farmer’s almost random initial kick of opening a farm, followed by the establishment of a tool shop led to agricultural growth. The village grows into a city eventually. Although Maruyama was mainly interested in the deviation-amplifying process, deviation-amplification and deviation-counteracting may not generally be exclusive, which allows us a “synthesis” (Maruyama, 1963, p.15). Both processes form a social mechanism.

Thus, a social mechanism allows not only two types of processes of deviation-counteracting and deviation-amplifying, but also a self-destructing process.

Alcoholism (or any other drug dependency) is such a self-destructing process. Alcoholism is a process where the first initial kick of drinking behavior, which itself is driven by a small but insatiable desire for the better [= the 1st loop], mostly traps a person into a vicious cycle involving a self-destructing process [= the 2nd loop]. This does not necessarily mean that invariably one cannot get out of this cycle. However, one may find it very difficult to get out from the process once he/she is trapped in alcoholism. Opium is similar to alcohol in its functioning.

Alcoholism, or addiction to other types of entities, is reserved as a metaphor to indicate symptoms seen in individual persons, not in collectivity. In the above episode of F-town, we regard F-town as a social organism. Since, here, a collectivity is suffering from being addicted to, say, opium, I want to call this entire process “social” opium.

IV. Micro-Macro Linkage Problem

Regarding a collectivity as if it were a biological organism involves advantages and disadvantages both methodological and theoretical. One of the great advantages is that we can draw a clear-cut and illuminating picture by doing so. The disadvantage lies simply in the fact that F-town is naturally not a biological entity, hence, it is no more than a metaphor. Therefore, we need to be equipped with ways, methodological and theoretical, to surmount the disadvantage, two of which will be suggested below.

1. Reactors Within a Reactor: Their Power differences and Internal Political Processes

In the Ashbyan model, we dealt with F-town as a whole as if it were a kitten or any sort of organism. However, the model will require some other type of model in order to analyze the internal political processes within F-town, where more or less heterogeneous actors must have been active.

F-town has been and is led by a Mayor, who was selected by town members through municipal elections, as well as by a town assembly. Voices of townspeople are not naturally unanimous, although a strong anti-nuclear power movement was not observed in this F-town case, as seen elsewhere (Kainuma, 2011). Interaction, disputes, and conflicts among townspeople are all part of the internal political processes, culminating eventually in a formal decision one way or the other through “democratic procedure.”

This decisional cycle starting with the issue of whether or not to invite nuclear power plants within F-town and ending with the formal decision, as such, should form, from an analytical point of view, a micro-macro linkage that has been

represented and captured by the so-called Coleman’s boat or bathtub (Coleman, 1990).

The decisional political processes within F-town form more than a mechanism that is relevant to the entire Ashbyan model. For instance, the motives and interests of participating enterprises, in this case those of TEPCO, are also involved in the internal political processes within F-town. The same is also true with the central government. Perhaps, the interrelationship and interaction between the government and TEPCO were more complex and closely intertwined, which formed a collective agent or actor as a conglomerate called *genshiryoku mura* (nuclear power village). Even within a few months after “3/11”, people from TEPCO and others were recruited into the government as bureaucrats (*Asahi Shimbun*, May 25, 2011, pp.1–2; *Shukan Gendai*, June 2, 2011, on “Inconvenient Truth,” pp.42–44).

2. Missed Opportunities

Being “addictive” does not necessarily mean deterministic. That is, not all impoverished towns and villages came to be dependent on the establishment of nuclear power plants. There are a number of towns that successfully stopped the construction of nuclear power plants (Kitamura, 2001; *Days Japan*, Vol.VII, No.6: 36–41) after a series of unyielding anti-nuclear power movements among the people. These are the cases where people did not miss opportunities to manage to do without “social opium.”

Within the entire process of “social opium as a social mechanism,” there are many bifurcating points of decision-making for reacting actors in a system, depending on which a successive unfolding of the state-determined system varies. Therefore, the system may not fall into a self-destructing cycle.

For example, when people seek to change from the worse for “the better,” an alternative measure rather than the construction of a nuclear power plant may be conceivable, although the immediate rate of returns may be much more modest compared with the amount of subsidies obtained through the decision of inviting a nuclear plant.

Even after that decision had been made, there might have been alternative ways of spending the extravagant amount of subsidies, instead of pouring them into constructing public but luxurious facilities such as a well-equipped athletic gym park (for which 2,900 million yen was invested in F-town), as well as roads and a public library, whose maintenance was financially unsustainable for such a small town. Possible alternatives at each bifurcating point of decision will provide us with research on “missed opportunities” (Kosaka, 2011) by retrospective reflection, regarding ways in which a system fell into a trap of a social opium.

V. Concluding Remarks

In this paper, we outlined “social opium as a social mechanism” in a rather explicit way by using the Ashbyan cybernetic model of an organism and a preliminary effort to construct a formal model, which hopefully captures well the vicissitudes of F-town located adjacent to Fukushima First Nuclear Power Plant.

F-town sought for “the better” at the very starting point in the 1960s, but ended up with “the worse” or, even “the worst” since the people became *genpatsu nanmin* (nuclear power refugees) with little hope of going back to their home town, at least in the near future, after the incident and accident that hit the area in March 2011.

“Social opium” is a metaphor, which sounds like an evil. However, in this paper, we used the term only to represent a particular type of mechanism that can be expressed by a mathematical model. As to the connotation problem, “social opium” sounds quite contrary to “nuclear power,” which held positive connotations, at least before “3/11.”³⁾

Indeed, the present paper is to be followed by further research; this will be developed in two ways apart from elaborating the social processes in the form of formal models. First, we assumed that the social opium here for F-town was the subsidies to ameliorate the socioeconomic situation, or at least that was the intention at the beginning. However, where did the subsidies originally come from? Perhaps, they originated in the national policy toward nuclear power initiated and promoted by Yasuhiro NAKASONO (the then chairperson of the Nuclear Power Joint Committee within the Diet in 1955) and Matsutaro SHORIKI (the first chairperson of the Nuclear Power Committee, 1956), which can be traced further back to the “Atoms for Peace” US policy advocated by then-US President Eisenhower. Once we reflect retrospectively upon the chain of mechanisms, we come across the global societal current that led the whole world to build nuclear power plants right after World War II and subsequently. In this sense, we should focus upon this social opium of nuclear as a social mechanism in the wider global context in future study.

Second, we dared to conceive of F-town as an organism where more emphasis was put here on a preliminary sociological analysis as the first approximation of what happened to F-town. However, this preliminary analysis naturally should be complemented by the additional analysis of F-town’s political processes without assuming that F-town is an organism, to examine more closely what has happened (Kainuma, 2011) and what might happen in any other town in the future.

3) F-town used to hold up banners across the street saying “Nuclear Power as Bright Future Energy,” or “The Right Understanding of Nuclear Power Makes for a Rich Town.”

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