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Comparative Studies of Minamata Disease between Inside and Outside of Japan: Focusing on Mercury Contamination in the Amazon

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Abstract: The Minamata Disease in Japan was one of the most notorious public nuisance cases in the 1960s and 70s, but is still ongoing "unfinished business" in terms of victims' protection even after several decades of struggles. The world standard of epidemiological causation has still been applied in limited cases. However, it has been pointed out in the international report that, in recent years, mercury contamination has decreased in countries in the Global North, except the Canadian Indigenous peoples' case, at the same time that it has increased in the Global South. In the Amazon, many Indigenous peoples, most prominently, the Munduruku people in Para state and the Yanomami people in Roraima state, suffer from the Brazilian Minamata Disease due to mercury contamination differently as a typical case of global environmental injustice issues. This paper discusses the comparative difference of the Minamata Disease between inside and outside Japan: In Japan, accumulated mercury contamination in Shiranui Bay of Kyushu due to the poisonous waste release by a big corporation named Chisso Co. was serious, while in the Amazon, contamination due to gold mining by ASGM has been much broader and more diffused. Thus, civil law damages litigation has historically worked despite some challenges in Japan, while it's practically impossible to stop numerous small scale gold mining by judicial approach in the Amazon. Instead, the administrative regulation under the Lula administration contrasted to the Bolsonaro administration might be especially important, although it's still limited, considering the global demand for gold and related continuous gold mining activities. Minamata Disease symptoms among the Indigenous peoples along the Amazon are generally minor compared to the Japanese case, but they should also be considered the case from the liberal standard that criticizes the traditional stringent standard such as the Hunter=Russell criteria. However, facing the worsening situation of mercury contamination, the challenges in the Global South are serious: The effective measures for their global health are limited except for dietary education to avoid poisonous carnivorous fishes as opposed to herbivorous fishes. International assistance for providing clean water is also imminent agenda.

Keywords: Mercury contamination; Minamata Disease; Gold mining; Global Environmental injustice; Epidemiological causation; Indigenous peoples

1. Preface

Minamata Disease due to mercury contamination has been dying down in Japan, even though it has not been resolved at all. Furthermore, outside Japan it has become a global health issue across the world despite the 2013 Minamata Convention[1]. According to the international environmental

[1] The Minamata Convention on Mercury was signed on October 10th, 2013, in Kumamoto, Japan and was effectuated in August 2017 to protect human health and environment from anthropogenic mercury emissions and releases (Art. 1). As of February 2024, there are 128 signatories to the treaty and 148 parties, including Brazil, Peru, Colombia and most of Laten American countries.

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report[2], in recent years, mercury contamination has decreased in countries in the Global North, except the Canadian Indigenous peoples' case[3], at the same time that it has increased in the Global South.

Against the backdrop of the Japanese experience of several decades since the official recognition of the Minamata Disease in the mid-1950s and its legacies including negatives, this paper analyses the commonality and differences of the Minamata Disease situations between inside and outside of Japan, focusing on the mercury contamination in the Amazon.

2. Brief History of Japanese Minamata Disease

The history of Japanese tragic Minamata Disease struggles for more than past several decades has developed with judicial litigations and related administrative regulations in Japan and it could be divided into four parts: (1) Mercury Accumulation by Waste Release by Chisso until the Kumamoto District Court decision of 1973; (2) Limited Relief by the 1977 Diagnostic standards; (3) Gradual Expansion by Political Settlements from 1995; (4) Judicial Expansions by No More Minamata Decisions afterwards[4].

(1) (First Stage) (Mercury Release Accumulation without any Regulation)

Chisso Corp. established at Minamata, the southernmost city in Kumamoto Prefecture in early 20th century, already started to release mercury for the production of acetaldehyde in the 1930s and increased release in the rapid economic growth era in the postwar Japan. Shiranui Bay communities faced dying fish and cats, and the seriously paralyzed Minamata mercury poisoning patients were finally officially acknowledged as Minamata Disease patients in the mid-1950s. Victims and their communities were marginalized and discriminated against, as a photographer Eugene Smith (1918~1978) showed[5]. Without effective measures to stop contamination[6], the Minamata Disease litigations both in Kumamoto and in Niigata were among 4 notorious public nuisance litigations in the heydays of the rapid economic growth era of the 1960s and 70s.

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[2] GAIA AMAZONAS WITH THE SUPPORT OF UN ENVIRONMENT, THE AMAZON BIOME IN THE FACE OF MERCURY CONTAMINATION: AN OVERVIEW OF MERCURY TRADE, SCIENCE, AND POLICY IN THE AMAZONIAN COUNTRIES (2019) 3.

[3] The Canadian Minamata Disease in Grassy Narrows and Whitedog in Ontario, Canada, is exceptionally serious. It's due to Dryden Chemical Ltd dumping of more than 20,000 pond mercury into the Wabigoon river system between 1962 and 1970. The pollution is still ongoing and affects Grassy Narrows/Whitedog First Nations. See, Kunihiko Yoshida, *Shocking Realities of the Canadian Minamata Disease Compared to Achievements and Challenges in Japan*, in: do., CIVIL LAW REGARDING INDIGENOUS PEOPLES AND IMMIGRATION (Civil Law Theory Series vol. 8) (Shinzan Pub. Co., 2024) 271- (originally in: OSAMU MORITA ED., THE FRONTIERS OF CIVIL LIABILITY (Yuhikaku Pub. Co., 2019)). See also, e.g., Masazumi Harada et al, *Canadian Indian Mercury Poisoning Case*, PUBLIC NUISANCE RESEARCH Vol. 5, Number 3 (1976); do. et al., *Mercury Contamination in Indigenous Communities at Ontario, Canada*, MINAMATAGAKU KENKYU Vol.3 (2011).

[4] YOSHIDA, *supra* note 3, at 279-. See also, e.g., MIYAZAWA NOBUO, 40 YEARS OF MINAMATA DISEASE INCIDENT (Yoshi Pub. Co., 1997); TAKAMINE TAKERU, BRIEF HISTORY OF MINAMATA DISEASE (3rd ed.) (Kumamoto Daily Shimbun Co., 2008).

[5] See, EUGENE & AILEEN SMITH, MINAMATA (Holt, Rinehart & Winston, 1975). Its Japanese version was published in 1980, 1991 by San'ichi Pub. Co. The movie "Minamata" (2018) starring Johnny Depp was based his story with some modification.

[6] Chisso Corp. just changed the release point from Hyakken to Hachiman in the Bayside in September 1958, and it exacerbated the mercury contamination.

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The Kumamoto District Court decision of March 20th, 1973[7] was kind of revolutionary, setting up the high standard of negligence demanding even the plant closure and introducing epidemiological causation implicitly, and it admitted 16 to 18 million JPY monetary damages depending on the disease level. Shortly thereafter in October 1973, the comprehensive victims' compensation statute named Public Nuisance Health Damage Compensation Act, was legislated. At this stage, the ministerial standard of the Environmental Agency in August 1971 for acknowledging Minamata Disease was broad enough.

(2) (Second Stage) (Limited Relief by the 1977 Diagnostic standard)

However, the new Minamata Disease Diagnosis standard of 1977 issued by the committee (Minamata Disease Identification Committee) was stringent and limited the scope of victims' compensation. It required, like the Hunter=Russell standard, all of ①mobility failure, ②balancing failure, ③concentric contraction of the visual field, ④hearing failure, in addition to simple neural paralysis. Dr. Tsubaki and Igata who lead the committee, argued that all those phenomena should coexist, but such backlash positions have been flatly criticized and considered nonsensical by Prof. Toshihide Tsuda according to the epidemiological arguments nowadays[8]. The comprehensive compensation statute mentioned before itself was applied stringently and victims had to face ordeals. Masami Ogata's case was a good example[9]. As Former Finance Ministry Bureaucrat Hirohisa Fujii frankly confessed, this unreasonable situation was related to the limited budget for the Minamata problems[10].

(3) (Stage 3) (Gradual Expansion by Political Settlements after 1995)

Tort law litigations to expand protection started globally in Japan in May 1980 and the political compromise settlement was made in December 1995 under the Murayama administration to provide ①around 10,000 Minamata Disease patients regardless of their acknowledgement with 2.6 million JPY, and ②victims' corporation with 60 million to 3.8 billion JPY. As its continuation, by the special statute of 2009, there was the provisions: 2.1 million JPY to individuals and further to relate corporations.

Thus, 11,000+ victims, by the 1995 settlement, and another 35,000+ victims, by the 2009 special statute, got some relief, while only 3000+ victims got compensated by the comprehensive statute of 1973. But notice that there were only 1000+ people, and 3000+ people alive in each case, and the amount of their provisions were just parts of the amount they could get in case of judicial damages litigations. Furthermore, the protected people were still limited: only 10% of the real victims and survivors could get some compensation, according to Attorney Mitsutoshi Hayakawa who plays the central role in the No More Minamata litigations mentioned later. In this sense, the negative legacy of the 1977's unreasonably stringent standard has still continued.

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[7] 696 HANREI JIHOU 15. It also criticized and invalidated the nominal amount settlements in 1959, by saying that it was against public policy.

[8] TOSHIHIDE TSUDA, WHAT DID MEDICAL DOCTORS DO IN PUBLIC NUISANCE CASES? (Iwanami Pub. Co., 2014) (new edition) (original 2004) 96-.

[9] For his exhausted experience, see, MASAMI OGATA, LIVING IN MESHIMA: MY LIFE OF STRUGGLES TO MINAMATA DISEASE RECOGNITION (Sera Pub. Co., 2016) 154-.

[10] Mr. Fujii's remarks in the NHK documentary program called Close-up Modern Issues aired on August 23rd, 2016.

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(4) (Stage 4) (Judicial Expansions by No More Minamata Decisions and Related Problems)

The judicial efforts made some progress to expand the 1977 standard. Both Japanese Supreme Cout decision of 2004 and 2013[11] rejected the 1977 administrative standard, by mentioning that it was unscientific to deny identifying Minamata Disease in the case of sensation paralysis.

Importantly in this connection, in the mid-2000s, the Shiranui Patients Association was established among the non-acknowledged patients to file 'No More Minamata' lawsuits globally in Japan to broaden the legislative protection scope in 2005. Another 3000+ patients got settlement in 2011 in Kumamoto, Tokyo and Osaka etc., although in that case the level of protection was similar to that of the 2009 Special statute, which was much lower than the judicial damages award. Thus, it depends on patients' will, length of their remainder of their lives, and their remaining energies.

From the medical side, in addition to Prof. Tsuda's criticism of the 1977 standard from the genuine epidemiological causation perspective mentioned above (see, footnote 8), it should be noted that there was a comprehensive broader investigation of Shinanui Bay Minamata Disease patients in its broader sese, spearheaded by Dr. Shigeru Takaoka in 2009, and that lots of Minamata Disease symptoms including minor ones, have been identified[12]. Believe it or not, the Japanese government and Chisso Corp. are still adamant in denying identification of Minamata Disease for those unacknowledged Minamata Disease patients. The mainstream of the Japanese civil law and environmental law scholars (Prof. Tadashi Ohtsuka and others) have oddly opined that the dual approach should be taken with regard to epidemiological causation, and that the discrete traditional causation should also be required[13], which matches with the negative position (of the Japanese government and Chisso Corp.) mentioned above and disfavors Minamata Disease patients whose reparations are still seriously needed. As is already justly criticized, Prof. Ohtsuka doesn't understand what is called Hume's theorem, and thus the genuine meaning of the epidemiological causation. This chaotic situation in Japan should be reprehensible from its world standard.

The judicial improvement sometimes stalled, in the face of this academic chaos among the Japanese environmental legal scholars for another generation since the 1990s after Dr. Harada's criticism[14] of the medical corruption among the Minamata Disease expert doctors since the 1950s and 1970s at least. Both Japanese academies have had actually collusive relationship with political and economic powers in some sense with incorrect understandings of additional requirements of 'damage (i.e., Minamata Disease acknowledgement)' and 'double causation'.

In this serious situation, the judiciary has been taking a zigzag position even in recent years: On the one hand, Osaka District court decision of September 27th, 2023, took a revolutionary position for victims' protection with the correct understanding of epidemiological causation, awarding damages to all of 128 plaintiffs, while Kumamoto District court decision of March 22nd, 2024, took a negative position by applying the statute of limitation with the odd interpretation of its starting point,

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[11] Japanese Supreme Court decisions of October 15th, 2004, 58(7) MINSHU 1802 (state liability litigation); April 16th, 2013, 67(4) MINSHU 1115 (litigation requesting cancellation of acknowledgement denial of Minamata Disease).

[12] See, SHIGERU TAKAOKA, MINAMATA DISEASE AND THE MEDICAL RESPONSIBILITY: THE HIDDEN REALITY OF METHYL MERCURY POISONING (Ohtsuki Pub. Co., 2022).

[13] See, TADASHI OHTSUKA, ENVIRONMENTAL LAW (1st ed.) (Yuhikaku Pub. Co., 2002) 508-511; (2nd ed.) (2006) 548-551; (3rd ed.) (2010) 671-674. His unreasonable position already started in the mid- 1990s in his JURIST article (vol. 1088, 1090, 1093 (1996)). For other scholars, see YOSHIDA, *supra* note 3, at 294-, 299.

[14] E.g., MASAZUMI HARADA, UNFINISHED MINAMATA DISEASE (Iwanami Pub. Co., 1985) 155-.

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although it admitted the possibility of protection outside of the 2009 statute[15]. The Japanese legal academia as well as medical academia should realize responsibility about this stalemate and should take matters much more seriously.

3. Difference of the Minamata Disease between both in Japan and in the Amazon

(1) (Preface: Globalization of the Minamata Disease)

Late Dr. Harada already worked on the globalization of the Minamata Disease and investigated the mercury contamination in the Amazon, especially at Santarem with late Dr. Branches in the 1990s[16] and surprisingly around 50 Japanese lawyers visited there when the Rio de Janeiro summit was held in 1992. However, regrettably the joint collaborative research between Japan and Brazil has been interrupted since then, although the research on mercury contamination itself has flourished in Brazil, unlike the situation in Japan[17].

Upon the request of a prominent scholar Prof. Paulo Basta of Fiocruz (Oswald Cruz Foundation in Rio de Janeiro, Brazil), I've decided to pursue this strand of research after a generation-long blank of joint research[18]. Coincidentally, to work on this issue, I visited the Amazon in Amapa state with Decio Yokota, an expert of this issue, in May 2022, and joined Prof. Basta's workshop in the Munduruku village to experience the Indigenous life along Tapajos River in Para state in March

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[15] See, for example, Shunsuke Itai, Achievements and Challenges for the Minamata Disease patients' Struggles, in: NATIONAL NETWORK OF PUBLIC NUISANCE LAWYERS, THE 53rd PUBLIC NUISANCE LAWYERS' NETWORK AGENDA (Kakehashi Law Office, 2024) 9-.

[16] See, e.g., Masazumi Harada et al., *Mercury and Methylmercury in Fish and Human Hair from the Tapajos River Basin*, 175 SCI. TOTAL ENVIRONM. 141 (1995).

[17] E.g., E.C. de Oliveira et al., *Mercury Exposure in Munduruku Indians from the Community of Sai Cinza, State of Para, Brazil*, 90 ENVIRON. RES. 98 (2002); K. Faial et al., *Mercury Levels Assessment in Hair of Riverside Inhabitants of the Tapajos River, Para State, Brazil: Fish Consumption as a Possible Route of Exposure*, 30 J. TRACE ELEM. MED. BIOL. 66 (2015). The leading scholar of late in this field is Prof. Paulo Basta and some of his works are as follows: Paulo Basta et al., *Mercury Exposure in Munduruku Indigenous Communities from Brazilian Amazon: Methodological Background and an Overview of the Principal Results*; do. et al., *Health Risk Assessment of Mercury Exposure from Fish Consumption in Munduruku Indigenous Communities in the Brazilian Amazon*, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 7940 (2021); *Impacts of the Goldmining and Chronic Methylmercury Exposure of the Good-Living and Mental Health of Munduruku Native Communities in the Amazon Basin*, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 8994 (2021). See also, Paulo Basta, Decio Yokota, Cecile do Souza Gama et al., *Mercury Exposure though Fish Consumption in Traditional Communities in the Brazilian Northern Amazon*, 17 INT'L J. OF ENVIRON. RES. & PUB. HEALTH 5269 (2020).

[18] On September 27th, 2023, the MOU for this international joint research of the Brazilian Minamata Disease was made between the Fiocruz and the Japanese Association of Housing and Wellbeing (JAHW), one of my affiliated associations. It consists of (i) general efforts to improve the situation regarding illegal gold mining; (ii) information sharing about the Minamata Disease; (iii) international collaboration regarding health check-up and health education for the Brazilian Minamata Disease patients; (iv) grassroots movement efforts between two countries (Brazil and Japan) towards financial and in-kind infrastructural aid for damaged Indigenous peoples; (v) international hybrid meetings and field work at Indigenous villages in Para state, in Roraima state, and in Amapa state etc.; and (vi) environmental Indigenous knowledge education for young generation.

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2023[19]. In the Amazon, many Indigenous peoples, most prominently, the Munduruku people in Para state and the Yanomami people in Roraima state[20], suffer from the Brazilian Minamata Disease due to mercury contamination differently as a typical case of global environmental injustice issues.

(2) (Difference of the Minamata Disease between Inside and Outside of Japan)

Let's think about the comparative difference of the Minamata Disease between inside and outside Japan: In Japan, accumulated mercury contamination in Shiranui Bay of Kyushu due to the poisonous waste release by a big corporation named Chisso Co. was serious, while in the Amazon, contamination due to gold mining by ASGM (Artisanal Small Scale Gold Minors) has been much broader and more diffused. Thus, as was shown in the previous chapter, civil law damages litigation has historically worked remarkably despite some challenges in Japan, while it's practically impossible to stop by the judicial approach numerous small scale gold mining activities in the Amazon. Instead, the administrative regulation under the Lula administration contrasted to the Bolsonaro administration might be especially important, although it's still limited, considering the global demand for gold and related continuous gold mining activities[21].

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[19] See Kunihiko Yoshida, *Limited Restoration of the Indigenous Village in Amapa State in the face of the Brazilian Minamata Disease*, in: do., *supra* note 3 (2024) 303- (originally in DISCOVERY OF COOPERATIVES Vol.355 (2022)); *My Amazon visit at the Munduruku Village in Para State*, in: *ibid.* 316- (originally in DISCOVERY OF COOPERATIVES Vol.367 (2023)). I was originally more interested in the environmental degradation including wild fire and deforestation in the Amazon and the Indigenous peoples living there. Then my great senior, Prof. Masato Ninomiya of Sao Paulo University knows Decio's father well and introduced me his son who happens to be an expert of the Brazilian Minamata Disease. Then I started to work on mercury contamination with Dr. Decio Yokota and his program leader Dr. Paulo Basta as a matter of course.

[20] On the unclear situation of the mercury contamination in Roraima state, see, Kunihiko Yoshida, *Realities of Mercury Poisoning to the Yanomami People in Roraima State*, HOUSING WELFARE RESEARCH Vol. 37 (2024). Davi Kopenawa's book (DAVID KOPENAWA & BRUCE ALBERT, THE FALLING SKY: WORDS OF A YANOMAMI SHAMAN (Harvard U.P., 2013)) is influential work that stresses mercury poisoning to the Yanomami people, but its description is shamanistic and lacks scientific data. On the other hand, according to Dr. Ana Paula Pina, a neurology expert, who showed me around the CASAI (Indigenous Yanomami people hospital in Boa Vista), most of the Yanomami patients there can be explained in a different way, i.e. as for example, malaria, tuberculosis, chlamydia infection, onchocerciasis, syphilis, or gonorrhea patients. See also, Kimberly Anne Sing et al., *Organic Mercury Levels among the Yanomama of the Brazilian Amazon Basin*, 32(7) AMBIO (Royal Swedish Academy of Sciences) 434 ~ (2003) (The situation of the Munduruku people is worse than the Yanomami people); Claudia Vega et al., *Human Mercury Exposure in Yanomami Indigenous Villages from the Brazilian Amazon*, 15 INT. J. ENVIRON. RES. PUBLIC HEALTH 1051 (2018) (Similar to Dr. Pina's understanding, Yanomami patients rather suffer from malaria, malnutrition etc.) .

[21] Thus, Davi Kopenawa, a leader of the Yanomami people in Roraima state, has tried to decrease this world trend in his book (DAVID KOPENAWA & BRUCE ALBERT, *supra* note 20, at 253-, 261-, 281-). However, it might be difficult to stop this irresistible demand as a matter of fact.

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Thus, there have been almost no cases regarding mining in Latin America. But exceptionally there are limited FTA international cases (at the International Center for Settlement of Investment Disputes)[22]. The dispute was between Canadian investors of mining companies and the Colombian government which regulates mining industry for environmental protection of Santurbán Páramo, around 500km north of Bogotá, near Bucaramanga. The tribunal at Eco Oro case (2021) was more sympathetic to plaintiff's request for damages for their economic damage due to plant closure in general, while it has moved to stress the public policy of environmental protection at Red Eagle case (2024). Even though they are internationally well known, we have to admit that those international law cases are only 'indirectly' related to gold mining. I doubt they are helpful for our topic.

(3) (Features of the Brazilian Minamata Disease)

Minamata Disease symptoms among the Indigenous peoples along the Amazon are generally minor compared to the Japanese case. The affected Indigenous people I met in the Amazon told me about their mercury poisoning symptoms such as forgetfulness; cramps and paralysis of their limbs; eye focus malfunction; occasional faint; and weakening grip power etc.[23]. But they should also be considered the case from the liberal standard that criticizes the traditional stringent standard such as the Hunter=Russell criteria[24]. There is nothing to learn from the negative legacy in Japan that has narrowed the acknowledgement of the Minamata Disease scope that has brought about lots of ordeals to Minamata Disease patients for a long time, as is shown in the previous chapter.

4. Challenges and Some Ways to Overcome

However, facing the worsening situation of mercury contamination due to gold mining industries, the challenges in the Global South are serious: The effective measures that should be taken by Indigenous peoples in the Amazon for their global health are limited except for dietary education to avoid poisonous carnivorous fishes as opposed to herbivorous fishes[25].

Indigenous peoples across the globe have been historically marginalized and discriminated against until the 21st century[26]. In the Amazon, in addition to climate injustice due to deforestation and related environmental degradation, Indigenous peoples are unfairly outstanding victims and sufferers of mercury contamination paradoxically, despite their environment-friendly religious animistic world view that is contrasted Euro-American anthropocentrism.

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[22] See, In the Arbitration Proceeding between Eco Oro Minerals Corp. v. The Republic of Columbia, ICSID Case No. ARB/16/41 (September 9th, 2021); Arbitration between Red Eagle Exploration Ltd. v. Republic of Columbia, ICSID Case No. ARB/18/12 (February 28th, 2024). They were discussed in the ASIL (American Society of International Law) Geneva conference on June 7th, 2024.

[23] See, YOSHIDA, *supra* note 3, at 308, 321-322.

[24] See, e.g., TAKAOKA, *supra* note 12, at 114-.

[25] See recent articles in the footnote 17.

[26] See, S. JAMES ANAYA, INDIGENOUS PEOPLES IN INTERNATIONAL LAW (2nd ed.) (Oxford U.P., 2004) 15-23, 26-48.

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(with Muybu Village master Mr. Jairo (next to me) at the terrace commanding contaminated opaque Tapajos river) (Professor Basta at far left) (March 2023).

Figure 1.

Facing their poverty, it has been pointed out that the internal communal economic development projects such as Ms. Arlete Leal's establishing cooperatives for producing Indigenous soap in Amapa state, should be vital from the social solidarity economy perspective[27]. However, we should also take note that the formation of their basic infrastructure itself is their fundamental challenges to avoid their Minamata Disease. The nation-state based governmental support is meagre, and international assistance for improving their situation is also imminent agenda. For example, when I visited Sawre Aboy village, one of the most contaminated areas in the Amazon, according to Prof. Basta's article[28], during my week long stay at the Munduruku village (Sawre Muybu village) in March 2023, I've learned from its village master Mr. Jairo's ardent appeal that international assistance for providing clean water and for increasing their transportation to get their daily necessaries itself is also imminent agenda[29].

Frankly such task is beyond my ability as an academic scholar, but I feel obligated to do my best to make networks towards this goal, including some negotiation to make requests for JICA's help for them[30]. We need to realize that this is exactly the forefront situation of the global health issues and that international communities should do some contributions, as part of 'global justice', 'climate justice', and 'Indigenous reparations', at multi levels such as (i) the international level; (ii) the regional governments level; and (iii) the NGOs level. There should be academic network of related associations as the background of flourishing international global help for the vulnerable peoples.

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[27] See, YOSHIDA, *supra* note 3, at 311-.

[28] See, Basta et al., *supra* note 17, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 9222 (2021).

[29] See, YOSHIDA, *supra* note 3, at 323.

[30] I visited the JICA's office in Sao Paulo to talk on this issue with its deputy manager Ryunosuke Kataoka on September 25th, 2023. He made proposals for applications for Japanese Foreign Minister's grassroots gratuitous assistance programs.

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15. See, for example, Shunsuke Itai, Achievements and Challenges for the Minamata Disease patients' Struggles, in: NATIONAL NETWORK OF PUBLIC NUISANCE LAWYERS, THE 53rd PUBLIC NUISANCE LAWYERS' NETWORK AGENDA (Kakehashi Law Office, 2024) 9-.
16. See, e.g., Masazumi Harada et al., *Mercury and Methylmercury in Fish and Human Hair from the Tapajos River Basin*, 175 SCI. TOTAL ENVIRONM. 141 (1995).
17. E.g., E.C. de Oliveira et al., *Mercury Exposure in Munduruku Indians from the Community of Sai Cinza, State of Para, Brazil*, 90 ENVIRON. RES. 98 (2002); K. Faial et al., *Mercury Levels Assessment in Hair of Riverside Inhabitants of the Tapajos River, Para State, Brazil: Fish Consumption as a Possible Route of Exposure*, 30 J. TRACE ELEM. MED. BIOL. 66 (2015). The leading scholar of late in this field is Prof. Paulo Basta and some of his works are as follows: Paulo Basta et al., *Mercury Exposure in Munduruku Indigenous Communities from Brazilian Amazon: Methodological Background and an Overview of the Principal Results*; do. et al., *Health Risk*

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Assessment of Mercury Exposure from Fish Consumption in Munduruku Indigenous Communities in the Brazilian Amazon, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 7940 (2021); *Impacts of the Goldmining and Chronic Methylmercury Exposure of the Good-Living and Mental Health of Munduruku Native Communities in the Amazon Basin*, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 8994 (2021). See also, Paulo Basta, Decio Yokota, Cecile do Souza Gama et al., *Mercury Exposure though Fish Consumption in Traditional Communities in the Brazilian Northern Amazon*, 17 INT'L J. OF ENVIRON. RES. & PUB. HEALTH 5269 (2020).

18. On September 27th, 2023, the MOU for this international joint research of the Brazilian Minamata Disease was made between the Fiocruz and the Japanese Association of Housing and Wellbeing (JAHW), one of my affiliated associations. It consists of (i) general efforts to improve the situation regarding illegal gold mining; (ii) information sharing about the Minamata Disease; (iii) international collaboration regarding health check-up and health education for the Brazilian Minamata Disease patients; (iv) grassroots movement efforts between two countries (Brazil and Japan) towards financial and in-kind infrastructural aid for damaged Indigenous peoples; (v) international hybrid meetings and field work at Indigenous villages in Para state, in Roraima state, and in Amapa state etc.; and (vi) environmental Indigenous knowledge education for young generation.
19. See Kunihiko Yoshida, *Limited Restoration of the Indigenous Village in Amapa State in the face of the Brazilian Minamata Disease*, in: do., *supra* note 3 (2024) 303- (originally in DISCOVERY OF COOPERATIVES Vol.355 (2022)); *My Amazon visit at the Munduruku Village in Para State*, in: *ibid.* 316- (originally in DISCOVERY OF COOPERATIVES Vol.367 (2023)). I was originally more interested in the environmental degradation including wild fire and deforestation in the Amazon and the Indigenous peoples living there. Then my great senior, Prof. Masato Ninomiya of Sao Paulo University knows Decio's father well and introduced me his son who happens to be an expert of the Brazilian Minamata Disease. Then I started to work on mercury contamination with Dr. Decio Yokota and his program leader Dr. Paulo Basta as a matter of course.
20. On the unclear situation of the mercury contamination in Roraima state, see, Kunihiko Yoshida, *Realities of Mercury Poisoning to the Yanomami People in Roraima State*, HOUSING WELFARE RESEARCH Vol. 37 (2024). Davi Kopenawa's book (DAVID KOPENAWA & BRUCE ALBERT, THE FALLING SKY: WORDS OF A YANOMAMI SHAMAN (Harvard U.P., 2013)) is influential work that stresses mercury poisoning to the Yanomami people, but its description is shamanistic and lacks scientific data. On the other hand, according to Dr. Ana Paula Pina, a neurology expert, who showed me around the CASAI (Indigenous Yanomami people hospital in Boa Vista), most of the Yanomami patients there can be explained in a different way, i.e. as for example, malaria, tuberculosis, chlamydia infection, onchocerciasis, syphilis, or gonorrhea patients. See also, Kimberly Anne Sing et al., *Organic Mercury Levels among the Yanomama of the Brazilian Amazon Basin*, 32(7) AMBIO (Royal Swedish Academy of Sciences) 434 ~ (2003) (The situation of the Munduruku people is worse than the Yanomami people); Claudia Vega et al., *Human Mercury Exposure in Yanomami Indigenous Villages from the Brazilian Amazon*, 15 INT. J. ENVIRON. RES. PUBLIC HEALTH 1051 (2018) (Similar to Dr. Pina's understanding, Yanomami patients rather suffer from malaria, malnutrition etc.) .
21. Thus, Davi Kopenawa, a leader of the Yanomami people in Roraima state, has tried to decrease this world trend in his book (DAVID KOPENAWA & BRUCE ALBERT, *supra* note 20, at 253-, 261-, 281-). However, it might be difficult to stop this irresistible demand as a matter of fact.
22. See, In the Arbitration Proceeding between Eco Oro Minerals Corp. v. The Republic of Columbia, ICSID Case No. ARB/16/41 (September 9th, 2021); Arbitration between Red Eagle Exploration Ltd. v. Republic of Columbia, ICSID Case No. ARB/18/12 (February 28th, 2024). They were discussed in the ASIL (American Society of International Law) Geneva conference on June 7th, 2024.
23. See, YOSHIDA, *supra* note 3, at 308, 321-322.
24. See, e.g., TAKAOKA, *supra* note 12, at 114-.
25. See recent articles in the footnote 17.
26. See, S. JAMES ANAYA, INDIGENOUS PEOPLES IN INTERNATIONAL LAW (2nd ed.) (Oxford U.P., 2004) 15-23, 26-48.
27. See, YOSHIDA, *supra* note 3, at 311-.
28. See, Basta et al., *supra* note 17, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 9222 (2021).
29. See, YOSHIDA, *supra* note 3, at 323.
30. I visited the JICA's office in Sao Paulo to talk on this issue with its deputy manager Ryunosuke Kataoka on September 25th, 2023. He made proposals for applications for Japanese Foreign Minister's grassroots gratuitous assistance programs.

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