

Improving the foundation of the environment, resources, and life in Chuuk: Pursuing the progress in public sanitation betterment and the current state of social capital

NAGASHIMA Shunsuke

Research Center for the Pacific Islands, Kagoshima University

Introduction

Chuuk has been combating serious environmental problems since 1980s to improve their immediate surroundings, especially those pertaining to work in the sea and on land, and beginning with the waste problem. The beginning of 1980s saw the successful deployment of public-private initiatives, especially WHO and the traditional chief system working together to fight cholera. Improvement efforts have been successively put into practice thereafter, and case studies have been carried out to follow-up interviews with the state government and small island Piis on their success stories and in the later years the reasons behind the declining performance. We also investigated the current situation on the matters relating to boosting the life and economic foundation, and their supporting infrastructure and social capital. As a result, we found that the changes in the structure of social roles could not be bound only to the changes in tradition to modernism, and each role required functional cooperation. The public sector, especially the state government, should actively ask for collective engineer support, and reaching overseas should strive to raise the base technical skills fit for the next generation. At local government level, it will be more effective to employ quasi-public servants MIRAB (Migration, Remittance, Aid and Bureaucracy), whose main duties will be to improve/maintain environmental sanitation (cleaning local areas, proper waste disposal, etc.). Although the NPO and NGO organizational standard has not reached the level of its neighbouring country Palau, there is evidence that the germinating organizations are sprouting and strengthening. We have confirmed the base for human resources, so along with overseas cooperative funds and actively recruiting trainees, we can look forward to a significant result. The development and the expansion of Chuuk Women's Association is a leading effort and even outshines to those of neighbouring countries, and it can be a precedent to the whole of Micronesia. We expect its advance. In addition, tackling them will undoubtedly bring remarkable improvements to the MPA (Marine Protected Area) management approach and waste management. The pending problems of road conditions are rapidly progressing for its preparation. These remarkable changes would no doubt bring initiatives based on successful experience to the Chuukeese society. The next challenge will be to use these as new social capital and organically bring it together. By overlaying the pressing concern of dengue fever with improving public sanitation (let us not forget the majority of disastrous cholera victims were the women who did the fishery activities within the lagoon), we hope to help in its

deployment.

Research outline

1) Research aim and overall structure

This is a case study of securing, maintaining, and improving the favourable living environment, especially the quality of public sanitation, by boosting the entire societal infrastructure and raising living standards within the small islands and the island regions. Living standards can be raised through wide-ranging building blocks that affect the living environment; these elements are:

1. materialistic and economical (hard-ware)
2. imperceptible and institutional (soft-ware)
3. emotional and spiritual (spiritual-ware)
4. human interaction and relationships (human-ware), and finally
5. ecological and natural environmental (ecological-ware).

Each of these components mutually interact together to form fundamental foundations, and the malfunction of any one of these risk deterioration of quality improvement. Acknowledgment of this, therefore, becomes a necessary prerequisite in creating and executing strategies to improve the quality of life.

The solutions proposed by co-governance (whereby the residents within an area are subjects themselves) are in need of a new development phase. It is important to supplement them with a voice from an influential third party. These together will be the social capital. The current state will be assessed and investigated underpinning social capital as such and as a means of raising the societal infrastructure and human relationships. The principal relationships between the elements pertaining to quality of life as well as their mutual relationships need organizing as part of a crucial step towards the development.

Drawing from our previous research, several issues emerge pertaining to public sanitation. The first is poor waste management, which also affects the management of the marine environment. Another problem relates to nutrition, health, and infectious diseases. Lastly, there are stresses upon household finances as the base for subsistence economy em-brittles and the rapid penetration of a weakening commodity economy. They are all connected and have been a persistent setback since globalization became problematic in the 1980s. This is especially true in Chuuk, where it remains to be one of the most serious problems. Naturally,Chuuk also faces problems unique to huge reef areas, but it is a shared common burden with the other island regions. Their underpinning problems lie parallel to global warming. The concrete truth behind the picture was gathered covering these ranges.

2) Research Result Outline

- 1 In order to ascertain information on the current improvements made on people's lives in Chuukese small islands and island regions, past accounts of cholera can be used as an important verification source. We aimed to understand how the society as a whole tackled the condition. Fortunately we were able to interview the person in command during the very first outbreak.
- 2 Further research was carried out in Piis to delve into how a specific region

managed the situation. Luckily, a healthcare assistant who knew detailed accounts of the then circumstances was back in Piis from the hospital under treatment. We were also able to corroborate the functions and the achievements of the traditional societal leader as well as the post-operational life improvements.

- 3 We were able to find examples of their successful efforts in dietary and nutritional improvements via vegetable growing, etc. However, there have also been cases where it was discontinued. There were similar circumstances within the governmental level as well. The political leaders have acknowledged that the failure was partially due to social structure.
- 4 Marine environment management is a crucial prerequisite for island life. Its quality, degradation and long-term resource management are manifesting in serious forms within the recent years: we have previously indicated the increased water level especially tidal surge, coral reef bleaching due to local high atmospheric pressure and elevated water temperature, increased frequencies and strengths of disastrous devastations such as large typhoons. Here, we bring our attention to the tradition and direction of marine protected area (MPA) management and its new outlook, with Palau as leading example of furthering development. Chuuk has a world-wide rare tradition whereby the women work as fisherwomen within the lagoon. They have been harmed and injured due to sanitation problems in the past. We can expect for women to take the role of the leadership.
- 5 Compatibility of resource preservation and development of a cash economy is also an important prerequisite for sustainability. Investigation of fisheries has been already conducted; the results need to be recorded. As the foundation of population maintenance lies with fisheries, especially in small island Piis, it is necessary to provide suggestions for their future industrial development.
- 6 The severity of the waste problem is not only getting bigger, but it is also showing signs that it is steadily improving. But there is world class problem within the atoll relating to drifting oceanic waste. The solution to this problem also relates to management problems inland, providing education for residents, and creating resources to clean the beaches. Investigation was carried out to glean the current situation of treatment and management of inside the bay/gulf, inhabited islands, uninhabited islands, and beach in the capital. We will set down the issues drawing comparisons against Palau which leads cooperative improvement to elucidate the truth behind the current situation.
- 7 Interpersonal and organizational networks may create a new breakthrough to the limiting solution to the aforementioned problem. Despite the leaders being highly educated and have high intellectual standards, there have been issues with securing their own engineering groups, and there are empowerment tasks related to them. However, there are positive prospects from NPO/NGO, especially from the Women's Council. We expect their involvement in improving sanitation will bring positive changes.

Full detailed account of cholera in Chuuk

1) Problem solving through chief reciprocity

Head Chief Susumu Aizawa, a Japanese descendent, left an impression during a talk back in 1984 - he stated that the proposition by the Head Chief for each chief to monitor the complete abolition of ocean toilets on other islands and for the chiefs to take in turn to provide as a thorough measure against the outbreak of cholera. He mentioned that since chiefs are approachable and are relied upon like a parent, they may unintentionally be inclined to approve exceptions. He further shared the difficulties in completely collecting the debt of small businesses (small goods, Yamaha repair shop, etc), and says that chiefs are not suited to act as intermediaries in businesses. On the other hand, they excel at using reciprocity as a method for problem solving, which is an extension of the traditional process.

The current picture portrays that of a system rapidly weakening and becoming hollow, but under that a chief is required to undertake responsibility as a mayor and as a political leader. But the original principle is different. The modern principles are based on: ① not for personal profits or gains but ② securing equality, justice, and transparency. Furthermore, it is important to ③ coordinate and cooperates with external organizations (including state governments, countries, and foreign aid), ④ meeting the needs of cooperation and collaboration, and ⑤ ensuring the effectiveness of business outcome.

However, the rapid change especially ① has not been easy and after much time it is in current state. It is one in which the chiefs who are close to the mayor or island chief agonize over. The 'responsibility like a parent' is, even in its distinctive meaning, a social relation capital.

2) Disaster ranking - Disease

We had an interview with Mr. Wilfred S. Robert, the Chief of Disaster Communication who was also a victim of cholera. He was responsible for a wide range of disasters, including disasters caused by human neglect. There are 11 different types and are ranked according to the weighting and are listed in descending order: ① typhoon ② mead/grassland slide ③ disease outbreak ④ flood ⑤ drought ⑥ tide surge ⑦ fire ⑧ oil spill ⑨ plane crash ⑩ sea craft crash ⑪ drear due boats (small sea craft lost at sea). The outbreak of infectious disease comes third and it lies heavily on society. There have been cases of landslide which is a characteristic devastation for flat islands with heavy rain. Its destruction is comparatively large, and the staff member in charge was even surprised by the scale on his first assignment. Considering the disease outbreak occurs infrequently, we can understand it to have the second biggest social effect after typhoons.

The subject of sea surge on Mortlock atoll we saw at the Japanese Embassy became an adopted projected by the FEMA (Federal Emergency Management Agency), was granted a recovery relief fund, and the evaluative report submitted. This case has been discussed on a number of occasions with DCO and related departments, but as it continuously remains specific to Ta Island, the conclusion is that the disaster is not related to 'global warming.'

3) The reality behind the spread of cholera

Despite requesting resources such as statistical data from the Head of Department of Health and their staff pertaining to cholera in 1980s, they withheld the information. However, Mr Wilfred S. Robert was a victim himself and he had vivid memories of it. According to him, in year 1982, 60 people died, a few died in 1986, and none since. Even if there was an outbreak, there won't be any deaths. It says "Repeated outbreaks in past" on various written inquiries (Izumi Kobayashi etc.), the 1982 incident was not only a sudden occurrence but also consequently had many deaths.

Many people endured the illness and had not reported it. The cause of the illness puzzled people initially and only when it became unbearable that they reported it. The first victim was from outer island northern atoll Fallap and was carrying another victim. Mr. Robert contracted the disease in a similar manner. It is the first case even for this country. Time was also lost when sending samples to Manila, Guam, and Hawaii and waiting for the results. During this time, the disease spread to the whole area. Unaware of the cause, people endured using only adjusted salt water. Some victims could not stomach that and refused to drink it - only when it was mixed with coconut that the sweetness masked the salt and they drank it. Coming in direct contact and carrying patients with exposed contaminated discharge also spread the infection. Mr Robert had himself been given a few dozen intravenous shots, and the pierce marks still remain. 3-5 people died on Fallap. There are memories of young children, men, and women. Since he left the island because of the illness, he did not know any detailed accounts of the aftermaths on the island.

4) Nursing staff awareness and preventability via social capital

There were also many victims on Piis Island. According to the healthcare assistant Mr.Fabiano Kosmes, 28 people aged 11-50s, mainly women, contracted the disease in 1982. There was only one death - a male in his 50s. He could not be reached and the treatment came too late. This was due to the conventional way of life whereby one doesn't go to a dispensary even if one is very ill. That resulted unfortunately too late. This case has been used to teach others.

Not so long afterwards, specialists from Manila etc. were introduced and became an international undertaking. There was emergency dispatch from WHO with the staff of federal government lasting one year and there were study groups at hospitals. "Benjo" (a local term used from Japanese reign) education was deployed under US support. The complete abolition of ocean toilets was thoroughly implemented. It was organized as a community activity and they burned the toilets and buried them underground. New toilets were created and they accepted donations from foreign aid. Hospital staffs and chiefs went to supervise and inspect. Since then there haven't been any ocean toilets. There were zero incidents in 1986. Even work in the whole of Chuuk only lasted a few days.

This complete transformation brought changes to the traditional housing structure, and the abolition of ocean toilets was a success. Was the resolution in 1980s in truth led by chiefs? As a part of the whole activities that took place, they complementarily exhibited the old compelling power. One can even say that without borrowing that power, the project may not have had the thoroughness that it did then. They did

not allow any exceptions afterwards, which helped creating preventive measures. Therefore, this case can be summarized as an example of “preventive force of social capital.”

Public hygiene and sanitation

1) Establishment of public hygiene principles: post-cholera social development

Ms Cathy Mori Asor, the Head of Division of Sanitation, Department of Health, stated that the tribulation of cholera had initiated social development in public sanitation and its principles have not been shaken since. However she admits the shortcomings. The basic strategy for rural society sanitation is: good toilet, good water, and education. It pillars on 5 programs: ① food supply program, ② school sanitation program, ③ country hygiene program, ④ vector control port, and ⑤ health education. The preventative measures against epidemics such as dengue or filarial is not flawless, and they are continuing to request aid and accept training.

It is important to incorporate the community to spread effective preventative and improvement measures, and it has been expanding with introduced US funds. However, the funds stopped flowing when the funds did not reach to the level of the citizens. With that followed the cessation of campaigns to improve hygiene and sanitation. That means this became truncated due to circumstances within the social organization despite accomplishing grass-roots expansion. This can be seen as rebound back to the revival of conventional distribution of social capital principles. It also demonstrates a case of “an obstruction of grassroots support system by social capital.” However, there are not all examples of failure.

To note, the Head is a granddaughter of Koben Mori, one of the first immigrants who fathered 6 boys and 5 girls. She is a daughter of Sanro and is a member of Mori tribe consisting 2000 people. Her cousin is President Immanuel “Manny” Mori and her nephew is a lawyer. Therefore she is in a position to know and understand the deep truth of the political reality. She also possesses opinions about the running of social capital through modern principles.

2) Sanitation surveillance carried out by citizens

There is one lady of Japanese descent, Nancy Aizawa, who is the youngest daughter of former Chief of Tol (Suiyo) Island Susumu Aizawa, he carried through with the business and was working in the metropolitan. However, with the death of her father, the agency of Yamaha moved to another store, and substantial management shrunk except shipping to outer islands. She specialized in computer science in a Hawaiian college and during this time she had written hygiene and sanitation reports for schools and restaurants. There were further demands of these reports, and she was employed by the Department of Health as a civil servant. We met during her first year there. She already possessed technical opinions. This is a case whereby monitoring of civilian activities was evaluated, but in MIRAB (Migration, Remittance, Aid and Bureaucracy) economic society, this is a conceivable form of employment. This case is related to proposition of Piis Island environment management which will be considered later. Her capability to be involved in societal matters is also related to Tol Island. The frequent occurrence of cholera amongst

women is associated with their active role in fisheries, which is a rare traditional gender role constituent. Women fish outside the mangrove within the lagoon in Tol, and men catch bonito and tuna using trolling. Nobody on the island possesses trailers or cars, and even now they only have wheelbarrows as transport on land. Living in a condition where opportunities to buy goods are limited, fisherwomen are still an important part of their lives. In addition to eliminating ocean toilets for sanitation, like the other islands, pigsties are located more than 15 feet away from the house as a measure to tackle leptospirosis. September is known as Sanitation Month, and there are a number of opportunities for campaigning for improved sanitation and hygiene.

3) Campaign against malnutrition: 1987-1988-1989

- Lessons from its success and its discontinuation -

The undertaking by a healthcare assistant (then) from Piis was an important archetypal grassroots sanitary and health movement. He organized and self-funded a campaign to combat malnutrition after noticing one undernourished child. Every two months, measurements such as weight and height and basic tests of the children were taken and were released- this brought a competitive edge to parents and guardians. This was an effective method as this small island society operated under a deep understanding of one another and their functions. Using tact, which makes use of communality and constructive participation, as well as tapping into people's ambition to want the best for their families, are some of the elements of social capital.

This project extended to submitting monthly reports to hospitals and the state. It then advanced to gaining approval from the country and received inspections. Two years later, they received subsidies from overseas to support gardening projects. They grew vegetables such as egg plants, Chinese cabbage, cucumbers, cabbages, and watermelons. Almost all the households in Piis have started growing vegetables at home (side note: currently Pingelap and Kosrae are near deployment stage). Furthermore, nutrition education campaigns for women were developed. This was truly a striking case of a remarkable change brought forward from a small island, and it seemed to head to sustainability; however, due to the aforementioned circumstances, foreign aid was withdrawn even to a point where they could not buy seeds. The locals knew the health benefits of continuing to produce crops in the garden, but the project stopped due to problems securing funds.

A lesson can be learned from this-that education and enlighten mental one are not enough to maintain the efforts to improve living. They need to secure MIRAB support or to create independent purchasing power. In other words, improvements must extend to the core base of private and social life. The indication of the latter is the vegetable patch, where a shop owner grows green leaves to cook. There are vestiges of a very few households who are continuing to grow vegetables on a small scale. There is a small amount of cash flow in Piis households, and its network of relatives (internal social capital) through income from fishery and associate public services. As the problem of malnutrition itself was recovered, it affected preparations for other progress. This also affects collaborating external driving forces and lacking outer social capital.

4) Compliance effects of prohibition act- its successful development and reality

As stated by David Hanlon (1988, *Remaking Micronesia: discourses over development in a Pacific territory*, University of Hawaii Press, pp.154-157), prohibition law of alcoholic drinking was established in Chuuk in 1977. This is an illustration representing the strong political power of the women. Since the beginning of the 1980s, there has been extensive coverage and many reports of its compliance and special exclusions from compliance in Weno, the state capital. It is still legally effective after 35 years. This problem parallels that of illegal drugs, especially ganja (marijuana), and social problems are both rooted in common grounds. This is also an important part of the public hygiene problem.

However, the reality is that of alcohol sales, which shows no signs of prohibition. Alcohol is sold generally, and public drinking is seldom reproached. The visits during the 1980s saw strictness, and private whisky-related gifts were much appreciated. As a way of saying thanks in early the 2000s, a Christian dignitary recommended against giving his counter parta gift as he knows his habits after drinking. On the roads, large quantities of empty beer cans are squashed by cars and found scattered. Some say it has been true since the 1970s, but there are heaps of empty cans and bottles on uninhabited islands, and even during this investigation there were many discarded in cardboard boxes. Due to certain circumstances drinks previously limited to restaurants and foreigners broke down in 1990s. However, this is a Christian society with constructive reciprocated participation, and within this complex social capital society they are creating prohibition compliance groups. Additionally, female play a role in the society and its moral culture, and there are only a limited number of women who drink. It used to be absolute, but currently it is more relative. What might be highly praised of the present state is the effective control of excessive drinking, especially by families and associates, and it functions as a preventive social regulation as part of social capital control.

Furthermore, quickly brewed alcohol made from sugar using yeast (they call it flour) was seen in the shoreline forests located on the outer edge of the communities in Pingelap Island, Pohnpei. Also, recreational activities undertaken by youths during weekends and religious holidays are over looked as there is little alcoholic consumption and they do not cause problems apart from hygiene and sanitation. Similar observation was made within an outlying uninhabited island in Chuuk atoll with the presence of empty bags.

5) Illegal drugs, prohibition, and the reactions

Marijuana use has been indicated as a social problem since the 1990s. It is also related to high school dropouts. The latter is a by-product of declining social capital control as there are students from remote islands who live in relatives' homes to go to school, but it is accompanied by long-continued problems with social principles that cannot stop drug dependence. Last year, there was a murder on a dark public road near Weno airport in which drug use was implicated. Drug users, many of whom are in their 20s and 30s, can be occasionally seen on urban public roads day or night, unsteadily swaying with a hollow gaze or uttering strange sounds. Passers-by' s surround them at a distance and look worried, but they're only keeping distance.

The problem of drugs persists even under social capital monitoring, and it exists in remote islands as long as there is the difference in living standards. The regional police (who are not like civil servants, but lie close to volunteer firemen in Japan in social positioning), as well as island leaders' turn a blind eye to drugs. However, it is not socially acknowledged or recognized.

We have asked about the drug problems at various social levels. Levying is thought to be the most effective for alcohol and tobacco, but everywhere there is a cultivating environment for home-grown drugs, and it is not the public transactions (Goto, Shinpei officially imposed heavy taxes in Taiwan), and there are no specific scenes identified. There is no alternative but to enforce regulations such as compulsory punishment and custodial compliance. There have been a number of opinions supporting the need to pass laws to arrest, punish, and fine the offenders, but many add that it depends on the discretions of leaders especially politicians. Within the social structure where there is reciprocal containment, some say there is no other way of breakthrough other than publicly elected leaders. As one of the solutions, there are many who support the possibility of women legislating as they did with the prohibition act. President Mori's sister is an avid anti-drug specialist and is expected to exhibit leadership and initiatives of the Women's Council. However, we are still anticipating.

Amongst those involved, it was considered as a decisive step. Radical improvement measures that target problems such as murder cases linked to drugs need a collaborative structure by the judicature, legislation, and administration, and we hope the complex matter to be handled properly. This again is connected to the public hygiene problem.

6) Dispensaries

Let's look at the current condition of Piis dispensary and then the case of small remote island with hygiene, sanitation, and health problems. The original system for the dispensary constituted two healthcare staff. The male staff underwent a treatment for an illness, but he returned to the island straight after his recovery. He is a younger brother of the Head of the Elementary and Middle School. The female staff only managed drugs, and the dispensary (of which the building is closed) has been semi-closed for the past two years.

We have summarized the interview results. The other remote island regions are in a similar position.

- a. The facilities of the initial dispensaries were funded by FEMA.
- b. Medications were covered by state budget and the order of priority was 1 antibiotics, 2 pain killers, 3 uacire, and 4 anti-worm medications.
- c. The emergency unit is not equipped with resuscitation or oxygen inhalation devices.
- d. External injury (severed abdomen) inflicted by engine trouble was treated reading first aid papers. He lost his private parts but survived. He was not sent to a hospital.
- e. The underlying demand is the restoration of the pharmacy building whatever the size.
- f. Solar-powered low-temperature medicine storage is needed.

- g. Expectant mothers, especially for the first birth, are strongly encouraged to go to the hospital in the capital Weno as there is nobody who can administer intravenous medication. There was a time when 3-5 mothers gave birth on the island. 10% of all births are on islands. From 5 years ago, 100% all first births are given outside of the island, which resulted in lower infant and maternal mortality rate. Surveys conducted on pregnant women are conducted annually and they are reported to health authorities.
- h. Three children on the island suffer from blindness, hard of hearing, and strabismus. There are no other illnesses.
- i. There were active family planning campaigns.
- j. At present no fisherwomen suffer from disabilities with their health.

Waste problem

1) Four waste problems and technocrats

Waste problems in Chuuk can be largely divided into four: ① serious refuse problem that continues to persist since 1980s, ② sewage problem, ③ oil spillage, and ④ garbage drifting into Chuuk atoll.

According to a veteran tour guide of diving originally from Tsushima, who has been diving in and around a sunken ship since taking up permanent residence from June 1978, he has noticed a clear change in the quality and transparency of the water. In recent years there has been ① a decrease in water transparency and increased incidences of muddiness/impurities found, ② lasting for a longer period, and ③ is notably characterized by irregularities that are not due to the tidal currents. He adds that ④ opaqueness and muddiness of the coast is very poor.

Chuuk aimed to have its atoll registered as a UNESCO site of world natural heritage, but it was rejected with one of the reasons being the oil pollution from sunken ships. Even before this assessment, oil contaminated water brought a sense of threat, and there have been social campaigns against the unstoppable oil spill from specific pre-war sunken ships, even starting to spread to foreign lands. We have directly received digital resources and materials from the said diver. From the point of view of "polluter pays principle," both Japan and USA are implicated in the responsibility.

The construction of the sewage pipes under the road of the capital island of Weno is still incomplete. The pavement has many potholes and the roads are becoming bumpier year after year. Drainage seems impossible as the road is like a river. This has been the case for a few years, and islanders are disgruntled saying it may take another 10 years before it is restored. However, according to the person in charge of the project, sewage repair and complete tap water supply have been a long-running challenge, but the repair work is nearing its end. A New Zealand manager from Chuuk Public Utility Corporation had explicitly outlined the dates and processes of future plans. There was a contract in the background. A public tender and competitive bidding happened, and a USA businessman living in Majuro, Marshall Islands, came as an independent public utility contractor. Many labourers came from the Philippines and genuine work commenced. It is almost possible to see the finish line including the

road paving. ①Sewage network planning is not just at the stage in progress but it is due to be completed next year. ②As for serviceable water, there is a need to increase the size of storage tank. There needs to be surplus room to counteract the instability as it is heavily reliant on rainwater as well as the supply water for the sewage. ③ There are plans to build more power generators. This is thought to help during power cuts or time constraints. As for the plans for solar power, it has reached at a stage of implementation planning for installation of a large one on Getsuyo (Udot) Island, and others will be installed on Tatsu (Tonous) Island and the outer island of Ylul. The presence of foreign technocrats is encouraging especially since the FSM government suffered from technocrat shortages.

2) Refuse disposal

There have been some new developments with refuse disposal from Japanese JICA specialists and volunteers. As the JICA group is managed closely, we can predict that in the near future they will apply strategies learned from experiences and successes in the advanced and neighbouring Palau technical systems. The refuse has been a continuing problem in Weno (Haru) Island for more than 3 decades. This problem has been printed in English overseas technical travel books.

Garbage has been collected using two 20 year old machines received as a grassroots gift from Japan (recorded as Osaka City: South 144). Only the one has been used publically as the other one is exclusive to hospital use. It deals with an island population of 10,000 people, which is one third of the state, and it has been scrupulously and repeatedly repaired using readily available materials such as wood. It also has an added workload of a large number of commuters from remote islands, and its already suffering effectiveness in collecting refuse and is hampered by bad road conditions. Before long, one from Hachioji'm Tokyo and another from another part of the country are expected to arrive. Landfill has reached its capacity. They are expecting to install new facilities with technologies that also target the rancid smell by ventilating air (JICA specialist is in charge of Palau, Yap, and Chuuk, and another person is in charge of Pohnpei, Kosrae, and Marshall Islands). Palau/Koror Model is a new ODA and JICA technical system uniting disposal site, collection, ventilation (combating foul smell), and systematic recycling processes are charged on a deposit basis. There is already a supporting unit for this in Palau and in addition has MPA established and put into practice; indeed it is an integral and combined environmental education.

The reality is for nearly 10 years it has been very difficult to use access roads as they were buried under heaps of rubbish, and a bulldozer was introduced to clear the road but suffered from frequent failures. Bolts needed for repair were on order. For a long time, it has been close to residential areas and has had children, dogs, and birds come and go. There are implications in some health problems. There were cases where garbage collection workers were paid in low level salary or in arrears. It is necessary to raise social awareness level.

3) Recycling

It was only in April that the proprietor of an iron (and iron-related) factory, a Chinese businessman, withdrew his business. The challenge was in the separate collection and establishing a compact disposal system. There are remains from Chinese businesses left, but additional measures are needed such as isolating aluminium, cleaning treatment, and shredders. After the investigation we visited Palau, and there was evidence of support from JICA etc and was fulfilling its potential especially on Koror Island.

There is also a task of securing foreign transactions. There is a plan for a joint business with Guangzhou, China, in October. They are also requesting for cooperative measures regarding unloaded cargo returned as a way of reducing transportation costs. Having a separation system will be especially important.

The deposit system whereby each empty can is awarded 5 cents has started, but there have been questions raised in meetings about its usage; exploring transparency should be welcomed in public debates. Currently, systematic checks run by local contacts are being organized.

The scrap body of motor vehicle with out the useful scrap parts have been accumulating on empty land between the shore and the mountain. This has created a public difficulty with dust management. The problem with recycling faces the limit with civilian responses, and it is a problem that is spread to the whole of the Pacific island region. There is a strong need for international collaborative measures including from Guam. There is a limit to subsidies given for transportation costs for remote islands within the country, as political strategy; there needs to be an additional concentrated disposal unit within the region.

4) Composting

There is a regional characteristic whereby there is little kitchen waste that could be composted due to having dogs and raising domestic animals such as pigs. It is not as if they are stock breeding livestock. The Community Resource and Environment Project, headed by a Pilipino college teaching staff (College of Micronesia, Chuuk campus), was awarded \$20,000 from WHO. They are currently developing a plan for composting in line with the project, but they struggle to overcome the lack of raw greens. Moreover, vegetable or ornamental gardening is not an established component of their lives. Therefore, the state Environmental Protection Agency (EPA) has been reviewing the proposal of promoting "Go Local" which aims to cultivate local produce by encouraging agricultural farms and dietary improvement, establishing a discretionary system, and linking that with environmental education.

Understanding the refuse problem is an indispensable part of environmental education. Associating garbage with the environment will lead to their self-awareness of contributing to environmental pollution. It is part of lesson 101 and is a basic principle of environmental practice. This will lead to their understanding of social responsibility and environmental responsibility as consumers. It is the practical cognition of Global + Local = Glocal Citizenship. The new compost proposal is a practical example of conservation of mass; its principle lies on reducing, reusing, and therefore taking part in ecological recycling. In other words, it supports their

understanding of the ecological cycle, which comprises of organic decomposition, organic production, and organic consumption. Their understanding of natural regeneration may radically shift their perception of mother earth and mother sea and thereby improving the quality of their surrounding environment. This can be linked with produce growing, and thus widening the possibility of a sustainable subsistence economy. The education for their own local regeneration and its implementations are the most fundamental element of all basics in improving the foundation for living.

5) Cleaning the rubbish off road

Civilians are becoming actively involved with the problem of road and roadside rubbish. It is spreading to local women's councils, youth groups, and environmental groups. They are taking part in cleaning the roads of the capital one weekend a month (mostly polymers), and grass is maintained and compostable garden waste is collected on Mondays by the Department of Agriculture. However, the state unkemptness unfortunately returns even after a week. Nevertheless, improvements are starting to take effect in improving the situation. One of pressing tasks has been targeting trashing aluminium cans on roads; improvements made to collect littered aluminium cans on roads may be accelerated with the backing of a system (on Himejima Island in Ooita, Japan, littering ceased with the introduction of deposit system with the effect of a deposit system and have advanced to become beautiful, still effective and active now).

There is large yellow metal shelving for garbage, which is donated by private individuals of whose names are inscribed on the gifts, and it is placed all around Weno Island and will have complete coverage including hill sides. This is not a problem unique to the capital, but its various maintenance and spread will need drastic measures. To name a few, the state of shore waste yard, increased amount of garbage drifting into the lagoon (of which is one of the largest in the world and is a paradise for divers wanting to explore the WWII shipwrecks), worsening water transparency of the bay, and reduced water quality in the coastal area. Because of the vast varieties of work on water, this should be worked on together with terrestrial improvement projects. By having people as part of the solution, it will help enhance their awareness and at the same time educating them about the environment. This hands-on approach will help to bestow civilian responsibility, and observing and experiencing the successful changes will hopefully encourage them further to look after the environment.

6) Rubbish in ocean and drifting garbage-the current situation and measures

(1) Measures against garbage on shoreline and promoting MPA opportunities

The shoreline of the capital island Weno seems to be in a constant state as a dumping ground for garbage and this is clearly polluting the ocean of a world class atoll. It has been a clear challenge even before registering for World Natural Heritage (similar to Fuji Mountain).The rubbish is not only a problem within the city. Moving away from the city, one can see more sights as if the sea is dumping ground. Pollution stands out on the whole of the ocean surface. There were also accumulated garbage sites deep in the mangrove on the coast. This is an unsightly comparison to the

Palau mangrove, which is environmentally similar, but no matter how deep one goes, rubbish is rare.

The manifestation of the environmental management (quality management as well as problems caused by global warming) and waste management to be the faces of the same coin is an indication that it has reached a critical state. New developments must take place which can help residents learn from previous achievements. For example, positive measures like an educational campaign taking an active part in coastal rubbish elimination (not of the drifted garbage but of the dumping ground) of Palau-type specified MPA is effective in that the results are seen right in front of their eyes. However, for a broader change it will take time. Children having positive hands-on experience with cleaning will help to continue that. It is advisable to involve Japanese specialist teams to contribute with procedural scientific management of beach cleaning, targeting the root cause and the branches. The waste management problems concerned are to be especially targeted for improvements so it is the best time to promote this.

(2) Coastal garbage within small island Piis

In principle, garbage is the responsibility of the individuals, including the roads and coastal areas reaching to shoreline which are in close proximity to one's house. Those neglecting their duties will be given warnings or orders from the mayor. However, beach cleaning has never been done collectively as a village (as a side note, Japanese remote islands do this on average at least twice a year), and the mayor himself, has not directly issued orders. We have spent three days consecutively to inspect the whole island.

1. The worst area was area facing Weno to area near the mayoral house, especially near ice making facilities
2. large quantities of foreign drink bottles, drink cans, and lunch packaging that have drifted ashore
3. a lot of plastics that have been there a long time that seaweed and algae have stuck themselves
4. a number of clothes, nappies, gas cylinders, empty ramen packets, rice bags, and even empty beer cans which is prohibited (they clearly originated from the islands)
5. Considering all of these, 70% -80% of the disposed items came from the houses near shoreline, and if including drifted garbage from within the island, more than 90% was the result of their own doing.

The measures needing in place are clear from this.

(3) Garbage problems on uninhabited islands

One can glean the seriousness of ocean pollution just by looking at the debris drifting on the water. They are easily visible everywhere even from moving vessels, especially the plastic bottles, shopping bags, flip flips, empty cans and bottles, and drink packs. This is a familiar sight, but it is getting worse and worse.

The six islands on eastern side of Piis are terrible:

- Pisemweu Island (Kojima in Japanese, hidden watch station of Navy): possibly due to fast currents but there are less than habited area. Some scattered near fishermen's camp

- Onaf Island (Ushijima, also known as the name of Military ship Island by glrape): semi-residential island used for fishing. 1-2 houses occupied. Scatters of household goods present, however they keep comparatively clean around. Digging hole for dumping and water.
- Tewenik Island: scatters of drifted materials
- Eparit Island: little clusters of garbage from fishing camping grounds and drifted materials
- Fonochu Island: small clusters of drifted materials and used yeast packets
- Sopwerii Island: mixed rubbish from fishing camps and drifted waste. There are big items that have drifted- even polystyrene packaging that was used for the ice making facilities which was given by JICA as a gift to Piss. The damage to the facilities caused by typhoons was a few years ago. We of course brought it back but it is a sign that there is a considerable amount of drifting rubbish gets circulated within Chuuk atoll.
- It is bad every where is but 3 islands lying to the east are especially appalling. It may be affected by ocean tides.

Two islands west of Piis:

- Pisininin Island: very little but there is a barbeque site
- Pissamwe Island (aka Paradise Island): very little but some small floats

The reason behind the uneven distribution of drifts is due to a large flow of the northern waterway that passes the centre of the two regions, and it goes out to the open sea. On top of this, the direct cause is the interaction between the current within the lagoon and sandbank that catches it. On the east side, the debris that drifts onto the shore are both relatively recent household goods and those that have been drifting in the bay, but it is rare to see either of these on the western side. There is also a man-made origin that contributes to the difference between the two. Whereas the east is an active fishing area, the west is chief clan own the control and has a feel of sanctuary. It is a stunning place to the point that they named it 'Paradise' and they remain true to the psychological testament to preserve something that is beautiful.

Fenangat Island is an island located near centre point between Piis and Weno which lies south. It is not possible to see from the sea. But there is a lot of drifted debris. There are loads in the forest. There is quite a bit of trash from picnics that has accumulated throughout the island.

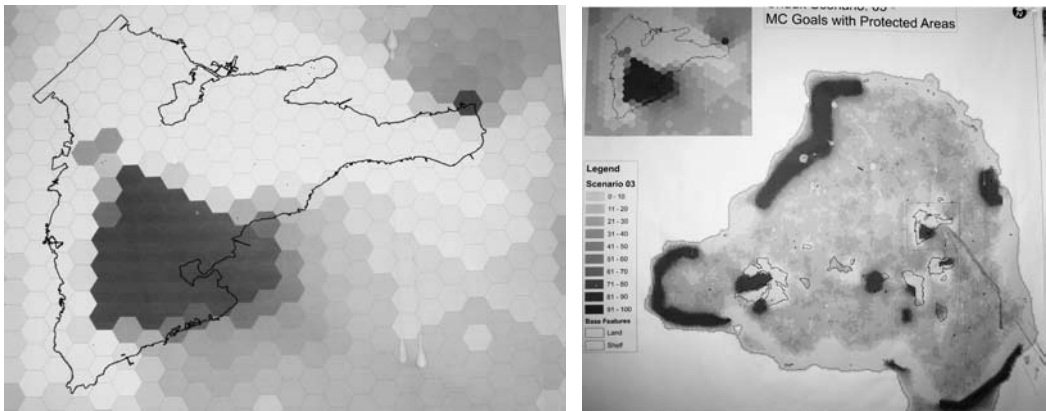
Pisiras Island was the worst of all. It is a relatively popular place for picnicking, and it has been used during weekends for drinking since 1970s (there were no visible old beer bottles, but they may possibly be present if dug out from the ground). There were concentrated cans and bottles trashed in and around new cardboard boxes in great quantities. Plastic bags contained remnants of food consumed during picnic. It is as if uninhabited island is a garbage dump. There was considerable amount of drifted materials also.

Ordering the level of severity, from worst to least, it is Weno's unofficial dump, Pisiras Island, Pis (Fenangat) Island, eastern islands to Pis, and the western islands especially Paradise Island.

MPA

1) Chuuk State MPA and personal rights adjustments

We were unable to find a map of Chuuk with clear and explicit lines drawing the boundaries in August 2011. A MPA schematic diagram of Weno/Moen Island was hung on a wall surface, but a detailed figure could only make out a blurred central part and its periphery. Environmental Protection Agency officer said there is no intention to release it to the public- a problem that could arise from making it public is that if the MPA adapted area and non-adapted area become clear, then fishermen will unashamedly come in to the privately owned part of the adapted area. He showed us the detailed diagram on the basis that it will not be made public as it is in process of making it formal. This problem is also associated with the daily lives of the fisherwomen working within the lagoon. Fishing activities carried out by women can be only seen in Japan and Korea, but women working in shallow sea is a unique traditional custom particular to Chuuk which has at times brought health problems including contracting cholera. The efforts and the chief/social response of the Japanese descendant head chief Susumu Aizawa has been introduced previously in (Nagashima 1986). The development, its details, and the surrounding circumstances are mentioned above. Chuukese society is considerably complex as matriarchal social principles penetrate through the transfer and the use of land ownership even today and it overlaps with fishing activities.



Figs. 1 The officially displayed Chuuk MPA map on the wall in EPA (with the logo of World Wildlife Fund).

Traditionally, MPA has originally been existing and has been controlled through use restrictions of areas owned by clans and taboos, but with growing awareness of personal rights and for business interests, even maintaining an order for fishing methods (mainly spear fishing), it is all at once giving birth to situations that could result in social changes. On the cost of the small island, women dive and fish and they process sea cucumbers on uninhabited islands while the men fish every day outside of small islands and on uninhabited islands. They pack them in ice purchased from state capital (ice maker given by JICA has been left untouched since it broke down), ship them every day, and are replaced next morning.

Comparing Chuuk and Palau MPA research, we conversely felt the lowness of commercial pacevitality in Palau. It may seem paradoxical that there are more commercially competitive Chuukese fishermen than Palau, but there is a high possibility of actualizing resource preservation and environment quality management through their systematic 'wise use.' 'Wise use' is inherently sustainable resource use, and per ISISA motto in Mauritius, one needs to learn from the intelligence of ethno-biodiversity order.

2) MPA as traditional societal custom

The funeral of an important clansman/woman is accompanied by sanctuary management on the remote island Piis located on outer periphery of Chuuk lagoon. This is known as *mechen*, which is a conceptual taboo term originating within the Pacific Islands. This area, which stretches 2 miles from the reef including islands and the terrestrial areas, is owned by the clan, and because they prohibit not only fishing and harvesting but also limit its usage, entry and becomes 'closed' during this period. The oldest clan member has the final say, but in his death his oldest biological nephew makes the decision and publicly declares it. When the mourning is over, they dine and the area becomes 'open'. Funeral aside, the period during its closure enables resources to restore and can pass on a recovered and better state for the next generation. The period varies from 30 days to 3 months, and it has been getting shorter recently. The harvest restriction on territorial resources has declined and is rare. The area on sea is also a limited area for clan relatives. However, the practice still exists as a regulation.

The custom is still practiced on Ramanung Island (NichiyoTou) where after the death of an important person the funeral the sacred area is declared (in recent years lasting for about one month) and is circulated to other places. There was a funeral of an influential person within the chief class near Weno Island (HaruShima) Salamen just before the research period, and the region between there and Dublon Island (NatsuShima) was specified as no fishing and no swimming area.

The ownership and exercising personal rights is by nature complex, and the above was an example of usage within Chuuk lagoon prominent island, but the fragmentation is advancing.

MPA related to the use of owned land depends on the aforementioned clan terrestrial management, but it is different from Yap's 'ridge to reef' but it does not necessarily target watershed management. This is becoming more complex and fragmented because of recent cash economy transactions. Therefore, there is an acute need to establish MPA that combines appropriate territorial and marine management based on re-researched state of traditional plant uses. However MPA itself is specified as an individual's owned area and the public has difficulty implementing specific actions. Overcoming this biggest challenge will need the present personal rights to be adjusted and with that are associated costs. It is essential to have procedures in place to cover complex and wide-ranging procedures even through facilitation of reasoning. In the current state of enforcement under traditional system (which is already fading) and with limited legislative measures or expenditure allowances, one could say that they are at a stage doing their best.

3) Fishing ban concerns and measures

One aspect of work JICA senior volunteers do is to introduce and spread the use of fishing nets to discourage fishermen from dynamite fishing. Some say that they are made in the black markets from construction sites and others make explosives by removing the fuse from sunken ships. It is a crime to take what is on a ship, but they seem to have a different conscience when it comes to bullets. Newly demolished areas are easily identifiable by a professional, so they are immediately inspected by a specialist from Palau International Coral Reef Centre (PICRC) and were reported. There are others who acquire dynamite through quarry black markets or stolen container fuses. Piis is the only island that does not use dynamite for fishing. Finely-meshed fishnets are also another problem along with resource management, and therefore Chuuk needs effective MPA.

However, there have been reports by overseas research groups, especially in the US, who claim the corals to be of good quality in MPA. It is necessary for them to see the picture outside of the area. The coral themselves are getting weaker. The mass breakout of crown-of-thorns starfish, they had to be killed by injections. It is a method different to Okinawa where mass of people is required to bring ashore, but there are associated costs involved.

As dynamite fishing itself is prohibited, there must be compliance, surveillance and appropriate punishments in place, but according to JICA senior staff, fishing using fishing nets along with its benefits of as superior haul and understanding resource preservation are encouraged as a preventative measure. He has worked in the fishnet division of Y Company for a long time and has been instructing to create handmade nets. He is actively engaged in the abolition of destructive fishing through instructing people to dodemersaldeep fishing around atoll which uses unused resources (OFCC has been spreading throughout Micronesia since 1980s after researching the resources) and reserving funds for the purchase of the nets. Deep water fishing is not only encouraged as it uses unused resources but also because fishing methods are becoming more proficient with technological support and are easier to fish. Even the successors are requesting for the dispatch of an expert in the same field with the knowledge (there already is an informal consent made with an applicant).

4) NGO for Marine resources and environmental conservation

Chuuk Conservation Society is a new NGO (established 2010) specializing in marine resources and environmental conservation. It was founded by Mr Wisney Nakayama, a son (age 36, born in Tochigi Prefecture) of the first President of FSM Mr Tosiwo Nakayama (born on Piharar Island, an outlying island off Lucunor in Chuuk State; graduated from college at age 23 and was employed by East West Centre; since then he has been climbing up the success ladder; former Research Centre for the Pacific Islands visiting professor, Professor Hunlon, from Hawaii University Research Centre for the South Pacific Islands has been planning to do biographical research since his term at Kagoshima University. The Society was funded by the Micronesian Conservation Trust, Micronesian Challenge, and various other world conservation groups. It currently employs two permanent staff and one intern. He is maternally related to the Piis village chief. There have been three occasions conducting research

on socioeconomic and fishery resources since 2008. He has profound experience in marine research and has expansive knowledge of the seas, island conditions, and terrestrial ecology. The Society has been prioritizing the preservation and protection of biodiversity. He has been involved in generating summaries of the diversity of corals, invertebrates, echinoderms, and the fishes. He was surprised by the fact that Kasiwajima Island has approximately 1000 species of fishes. Watersheds are used for large islands enclosed in lagoons. He is aware of the difficulties in the open seas which are fundamentally of different nature. However, this is a specialized subject different to his own thus expressing his desires for training opportunities in Japan.

They have assigned Ruklechic Islands (uninhabited island belonging to north-western island groups) as MPA last year because it acts as a sanctuary for turtles, tortoises and birds; we were appointed to investigate on its marine source. They were excited at starting the new community-based project next week on Peren Island. This is a collaborative project between various government agencies and the local council as part of Locally Managed Marine Environment; this is a typical Chuukese style.

The state government involvement varies accordingly. In Kosrae and Pohnpei, the government is responsible for areas outside of the mangrove, but this is not the case in Yap and Chuuk. Watersheds are structurally identical as Yap, but the boundaries of the areas managed are different. The locally managed marine area in Yap not only covers the sea but also extends 300m beyond the reef; fishing is strictly prohibited within this region and despite its relative decline the chief is involved. On the other hand, Chuuk's boundary is in principle limited to the area within the reef. Piis is an exception and it covers 1-2 miles outside the reef. There is an area designated for aquaculture but is not as large as those on Marshall Islands. There are big and small giant clam farms in Pohnpei; as it had been 15 years ago as the author found, there are still cases of theft. This may be due to difference in the fundamental awareness relating to the commons where in effect introduce and share resource uses opportunities.

The difference with Palau is that there are no incentives financially or with its national policy.

Yap authorities undergo deliberation during budgeting processes, and to the testament they are rarely in the red. The budget system has just changed from project-based budgeting to performance-based budgeting, making successful performance vital. The jobs with heavy responsibilities have increased and their duties heavier. One can hope this organizational enrichment to also plant international and collaborator significance.

5) Development and protection of marine resources and research institutions

The Korea South Pacific Ocean Research Centre of Korea Ocean Research Development Institute is located on eastern edge of Weno. They bought what was a resort hotel and refurbished into a facility. Such a department does not exist at College of Micronesia and its state branches. There is only one other research institution with this department, and it is University of Micronesia which does not host students with U.S. Land Grant Program in Pohnpei. This aquaculture development division has been having remarkable results with pearl oyster farming project and has advanced to

product development, commercial and marketing phase.

Their recent research has been to transport cultivated lapu-lapu, a variety of grouper, and flatfish, in its dormancy. They were tested based on survival rate after 48 hours when placed in sponges between 17°C and 29°C, and they found that 4 out of 8 survived at 22°C and started swimming again.

These two institutions have high level of expertise, but they still have yet to appoint a marine environment conservation specialist.

6) Challenges facing Chuuk MPA

The challenges facing Chuuk MPA can be summarized into 10 points:

1. MPA setup linked to personal rights and any small gap in the area becomes target for illegal fishing
2. Continuation of dynamite fishing
3. Oil leakage from sunken ship specified but not budgeted
4. Decreased water transparency
5. Corals weakening. Killed through injections during mass breakout of crown-of-thorns starfish, a method different to Okinawa where mass of people is required to bring ashore
6. Shoreline garbage and drifting pollutants worsening
7. Limited research institution collaborations
8. Need for organizational and functional expansion and staff enrichment for NGOs/NPOs that have recently been established
9. No presence of Palau-like incentives
10. Not enough activities to promote understanding and education for all residents.

Socioeconomics and Improving Coastal Environment on Piis Island

1) Civil servants on small island Piis

The whole area of Micronesia has a MIRAB structured society. It is important to understand the structure on which the society is based on and of its current state, but there isn't much understanding of the individual condition. We interviewed its state on small island Piis. It has been misconceived as being a heaven for civil servants but the reality is far different, and we have learned the hardships of island management.

There are supposed to be 700-800 residents but there are 648 people registered. The actual number of people living inside the island is 500 of whom 200 are children, and 300 live outside.

It receives around \$2000 per year from the state to cover the community municipal maintenance fee, but its expense reaches \$2245 per year. Those who receive payment are the Mayor, deputy mayor, traditional chief, and 12 councilmen, 8 police of whom 6 are from each clan and 2 are appointed by the Mayor. Even 100 \$/year per each member will be \$2300; it's like glorified volunteer work.

Training costs for policemen are covered, and they receive training on the job through undertaking various duties within the state. In 2000, the training period lasted only 2 months. Any administrative communications to each policemen or new information go through the village mayor.

The Mayor himself has been at the post since the independence in 1992. He reached his retirement age in 2003 and had been in the office for 21 years. He spent three years studying sciences at the College of Micronesia and graduated in 1983. He gained teaching qualification for primary school. From 1980s he worked in Weno and moved to a new appointment in Piis where he became the Principle of the school. It is from there that he came to the position of trust.

Civil servants paid by the state are 3 primary school teachers (grades 1-6), a dispenser assistant at pharmacy (there are 2 regular staffs but one is taking temporary leave of absence), 2 kindergarten teachers (one in charge of school lunch became redundant after they stopped lunch service). Their salary covers 52-week period. There are other state civil servants who work at tourist boards in Weno.

The teachers receive unexpectedly low wages. Principle aged 57 receives \$240/2 weeks. A teacher (49) who became a teacher after graduating from high school and has an additional qualification receives \$200/2 weeks. There is another teacher who is 38 years old. When asked in person, transportation costs \$25 each leg of the journey to and from Weno, and they say that \$100/week is not enough to cover the educational costs for their children. In the city washing dishes pays \$500- \$600/2 weeks. The answer to the question was that life on the island is not easy.

We also enquired about the school life. It is separated into morning session (8:30, 9:30, 10:30, 11:30) for grades 1-2 and 3-4, followed by afternoon session (13:00-15:30) for grades 5-6 and 7-8. The Principal is directly responsible for only grades 7-8. There are no classes for children with special needs. Academic year starts in August/September. Currently there are 90 children in total (Grade 1=18, Grade 2=13, Grade 3=9, Grade 4=11, Grade 5=14, Grade 6=20, Grade 7=8, Grade 8=8-9). Those progressing onto high school and therefore need to make preparations tend to spend more time out of the island. 20% tend to drop out mostly due to marijuana and alcohol use; this remains a social problem.

2) Overseas funds and state financial support to Piis

[FEMA]The Federal Emergency Management Agency (FEMA) has been to investigate Chuuk State on four different occasions- typhoon, ElNiño, heavy rainfall, and big waves. They communicate directly via phone once they arrive on scene. They may be stabilizing system from disaster social damages, as if social capital by overseas.

2002 July 12- 50 died due to heavy rain. Biggest damage seen on Tonous=Dublon Island (Natsushima), Fefen, Udot, Weno, Uman, and Toll. The Mayor was in Weno when this happened and recalls the severe damage. Luckily, Piis was not directly affected.

2003 December: attacked by big waves. Similar to when violent typhoon hit in 1970s, although not to same extent. There were some houses that were swept away and flood reached above floor. As it is a low-lying island taro-patches etc. received damage. They received compensation of \$200- \$2000 depending on valuation of each house. This is when the dispensary in Piis was built (the building itself which is currently inactive need to be repaired or rebuilt).

2004 summer- local ElNiño

2006 April: sea surge at Ta Island, etc.

[Plans for support and aid] Recent aid (\$200,000) was donated by Turkey for drinking water network service construction. It uses solar power to pump up the water, enabling supplying using stored energy during night time. This was a petition made by the Mayor himself. In primary school wireless network will be equipped, funded majority by state but also through donations from overseas support compact funds; this will improve electronic communications and correspondences. Two computers are due to arrive. Primary school toilets will be revamped. Kindergarten will re-open in September. The dispensary will return to its 2-people operation.

[Funding requests] Talking with the Mayor regarding the garbage found on the road within Piis island as well as on the shoreline, we have shared a collective understanding of the situation. As a persuasive reference, we introduced him to the case on outlying island Pingelap in Pohnpei State whereby two people were placed as cleaners who have revamped the cleanliness of the island and maintained it. As current administrative budget for Piis is limited, he has requested for support in employing 2 permanent beach and street cleaners, the proposal of which will go to drafting state government budget.

3) Piis income structure

The most stable income for the island is social security. The largest source of income is the fishing industry.

[Dried sea-cucumber] Recent sea-cucumbers have been good- there are two regular Korean merchants who transferred their business from Republic of Kiribati 3 years ago. These merchants tend to buy in bulk and move from place to place. In previous years it even attracted Japanese merchants. It nearly became prohibited as there was a fear of the resources drying out, but they have made successive appearances. Palau was hit badly and not only did Korol State prohibit harvesting the sea cucumbers for business but even private consumption nor was possession prohibited. However, there have been some Taiwanese descendants have privately harvested and dried them in an inconspicuous place; its demand is very strong and is becoming a boom. As a record, we will write the current selling value but the price itself varies according to its quality: penimwrang, pineapple = \$25/kg (can even drop to \$14 or \$20 depending on quality), potato asia, penifu, women leg, penikapach = \$15/kg, sea-cucumber = \$4/kg. On an island belonging to Piis, they were being boiled and dried using a camp. Lots were packed in many bags. The recovery of resources needs long durations.

[Fresh fish] 3-4 ice boxes are shipped between 3 families. They fish every morning between 8-9am apart from Sundays, and for late-night fishing they go out when the moon is not bright. The catch is shipped next morning 7-8am to Weno. The families split the profit after subtracting that with the cost of a box full of ice chunks that are priced at \$20 and fuel prices each way \$5. They don't take the extra charge of the carrier, and in all their taking is roughly \$25 per person. They usually come back with some shopping and relatives. Generally the fishes are sold to market vendors at \$1/pound, and in Weno they are sold in markets for \$1.5. Because bonitos are large they are cheaper per pound (75¢), and as troc as shellfish is heavy it is priced relatively cheaply at \$1/1kg (25¢ /pound). Lobsters are \$2. Oysters (Pachang) which are locally harvested solely by women are packed in pet bottles and priced at \$2.25 and sold in

markets as \$2.5. They are usually boiled in brine, garlic, or coconut milk and are amongst the popular items at the market. Currently, this is the only processed marine product produced within the island.

4) Fisheries in Piis

Fisheries in Piis have been undergoing the most active developments within Chuuk atoll. JICA has even gifted them with fishing boat and equipped them with ice maker. The ice maker was installed around 1997-1998 and was in operation for roughly 6 years. Since it broke the mechanism could not be maintained and fuel charges soared. It became irreversibly damaged after the typhoon. The fishing boat was even named 'Saraw' meaning barracuda, but it went down after the big waves hit. It is still left abandoned near by a broken embankment.

The main fishing method used is rubber spear gun. They use fins and snorkel to fish. They tend to use nets only for driving them into the net. These rules may be included as a kind of local MPA.

The foreshore within Piis lagoon is the fishing ground for women and they catch octopus, oyster, and fishes. Octopus catching is a family secret passed down from mothers to daughters for generations, instructing them the know how of a good catch. They usually work 7-8 hours 6 days a week. On the day of investigation, two women wearing one lens goggle (aged 49 and 37-38) were catching oysters near Pachang rock. An older woman aged 65 used to work as they have until recently but she has reduced her workload to 5-6 hours each day, 3-4 days per week. This is for household consumption, but it is also a precious opportunity for cash income.

There were also a few islanders constructing new stone tidal weir which already had caught a fairly large fish. It looked like a family unit working. They can draw the image without any map.

[Fishing ground] Islands lying to the eastern side of Piis are superb fishing ground. Especially between Pisemweu and Onafit is perfect for hurling fish. They were fishing



Fig. 2 Fish trap by stone fence.

as a family unit as well as catching sea-cucumber.

Social Contributions by Regional Groups

1) Chuuk Women's Council (CWC)

CWC truly has been developing and expanding numerous ways of contributing back to the society. They have handicraft studios in Dublon and Fefen and have a shop selling traditional goods in Weno. Men also work as well but they do more heavy-duty work and sculpting. At the shop there were stacks of books and printed materials (there are many in Chuukese as well) relating to activities they are involved in. They bring cooperative force to blood donation campaigns. They actively take the initiative to bring other organization to help cleaning roads. Their presence is vital for health, nutrition, and public hygiene developments.

They have long had the idea to create a museum for cultural preservation, but after tribulations it finally was completed on November 25th: it was assisted by a hotel owner (a former US Peace Corps member) and his wife who is the present CWC chairperson (her mother involved in launching CWC and a is direct descendent of Koben Mori) who supported financing and land, and they started building it with Japanese ODA. Amongst many there were high ranking governmental officials such as Vice President of FSM and Japanese Ambassador and had reached a total of 400 attended in the biggest ever large scale opening ceremony in Chuuk. In the following year, their first campaign took action to support "Multipurpose Facility to Promote Women's Independence and Local Populations' Health," funded by Japan's Grassroots Human Security Grant Aid scheme, calling attention to health. Locally this centre is referred to as "SMPoll Memorial Centre" after the mother of CWC chairperson.

The basis of its social structure is matriarchal, and Chuukese women are at the core of all activities; in Yap patriarchal structure has been more predominant and the women fought, but things are changing with the help with overseas NGO involvement including Japan. As their involvement stretches beyond Weno to islands in atoll or outer islands, they are in need of machine that can create and print out their own materials in Chuukese language. Ordering them from overseas or receiving ones using English can delay the processes, may incur more cost and is too reliant on others; these factors create too many opportunities for things to go wrong. Having their own devices will help them be autonomous and affordable in the long run. This concern was acknowledged by executive leaders.

2) Youth NGO

The youth program has been more critical in comparison. There may be organizations like NGO that exist, but its activities are limited. Leaders to an extent have participated in leadership workshop program which was supported externally and has been passive. Its main plan is at most organizing and running small scale entertainment and sports.

Considering the seriousness of the youth problems, there is very little targeting of the issues. For example, of the adolescents and young adults who came from remote islands or outer islands to attend middle school, high school, or collage, roughly 20%

drop out. In majority of the cases, they have no one to turn to and even the foster parents or home staying hosts themselves become helpless and not be involved in the programmes that help youths to reintegrate back into the society and rebuild their lives. Such social care is imperative for bringing quality personnel in future. It is important to have national policy to encourage youths to climb up the social ladder and be empowered, but the roles played by fellow civilians and NGO will reach out far and thin to provide beneficial treatment on individual basis, together with cooperative and collaborative efforts with the country, state, and the educational institutions. There is no evidence of meetings discussing development and revitalization of the local community. However, they showed interest in success stories of children on Marshall Island who faced similar problems; the programme was aimed at youths, including school dropouts, to be 'rehabilitated' and proactively engaging in social activities through music and making friends. They were also interested in Japanese Neyako system, an established and longstanding tradition found on Touthi Island. It is a youth camp system for boys above 15 with the aim to gain qualifications, be disciplined, partake in youth activities, and creates long-lasting relationships with their foster family and other enrolled boys (usually 5-7 people); this is an empowering system.

The level of developments required to bring changes cannot be only local a trial-and-error approach, but is in need of a well-experienced professional who can act as a supporter to build up achievements over the years. To bring forth cooperative developments for a social structure where the society raises its regional children, it is necessary to join forces with international NGOs and dispatch senior volunteers especially as it is the most fundamental task facing Chuuk, which is in the midst of a traditional social structure reformation.

3) Japanese Involvement and Overseas Groups

1. Overseas support and cooperation (Japan)

Japanese support groups are not lavishly but are contributing significant achievements. Japanese involvement is drastically changing in the midst of generational change and declining ex-servicemen's club meetings. Here are some cases.

Tokyo Rotary Club has been joining forces with its Chuukese counterpart and has been reaching its support to outer islands as well. Recently, 5 solar-powered salt extractors, which allow sea water to convert to both drinking water and salt, were donated and were received in the community with high praise and success. The remote islands off Chuuk lagoon each received about five machines. These outer islands are: Halls region, Nommn Ruo, One, Ululu Onan, Onoun, Pathw region, Tamatam, Polowat, Houk, and Pollap. They have also donated towards Terakoya-style (i.e. those organized by the local residents) educational facilities, enriching them with both hard-ware and soft-ware. The Rotary Club gifted them with machineries such as computers and a New Zealander is involved providing tutorial support. We were able to visit the facility at the opening ceremony during the research period. The facility was named "Akoikoi" which is name of a bird. Opening Ceremony was held by Japan (rice cake or candy throwing as if ridgepole-raising ceremony) and Christian mix style.

There were many local residents and children present. It is located in a region where it received attention because of a problematic public order and shoreline garbage, but amidst problematic inclination introducing this new advanced system targeting the future generation will enrich and deepen the living foundation.

On a separate note regarding local rotary club activities, when we introduced donations made by Pohnpei Rotary Club, they donated handcars and welfare equipment. significance is deeper than foreign aid in that they know the ins and outs of the island and its former member is involved in creating a large-scale settled community since immigrating 100 years ago to Sohkes, and 55 years ago to Mand, Pohnpei. A local providing support for their fellow locals in itself is an aid from the social capital network.

A group from Hiroshima has been actively donating educational materials, sports goods, stationeries, etc.

The Kanagawa Prefecture Medical Association has been involved in a deep and meaningful exchange. Currently, the relative of the former traditional chief Susumu Aizawa is the chairman of the group. The benefactors have been actively supporting medical consultations and donating simple but useful medical equipment. During the research period, there were two doctors present.

Other people such as the tea ceremony group are also contributing to and supporting the development of FSM. It was started by a Kansai person who likes islands and has further aims to investigate difference between tea and kava (yangona) cultures, breeding piperaceae (pepper family) crops and providing plantation support (a plantation operated by a Japanese in Pohnpei is facing difficulties in continuing business due to aging) and be involved in its fair trade import. The supporter has started to visit Chuuk more frequently.

2. Quasi-Japanese society space and the significance of the interchange

It has been estimated that at most 40% Chuukese have Japanese ancestry on some level. This is not a strict number but even its important leaders show a strong trace. This strong ancestral link is one of the reasons for an active civilian support. It was relatively easy to find Japanese descendants in Piis, for example a farmer named Romeo Harfmann. His grandfather on the maternal side was Japanese (who passed away in Piis on 2002 October 21; born and raised on Suiyo Tol Island with Japanese mother and German father) and the paternal grandmother was Toshiko (Japanese father, Sakayama).

For a few years there have been emerging pictures of building a Japan-Chuuk Exchange Centre on the land owned by former village chief Susumu Aizawa. The FSM Ambassador to Japan and Chief of State Tourist Board are amongst those involved. This is the land where pioneers starting with Koben Mori had a family with a local and started becoming involved even before Japanese reign started. It soon approaches 100th anniversary of Japanese reign. It has been an important place for dried bonito production, and it was a combined fleet anchorage and received concentrated damage.

The recent economic link has dwindled to receiving periodical shipments of imported goods. On Dublon Island (Natsushima), FSM government built an ice making facility with ¥2 billion loan from Japanese government, but the facility started deteriorating

to a point when it needed a replacement, but due to lack of funds it had to make do by carrying out patches of repair work where possible, and the facility was scaled down. Its biggest user is the Chinese fishing group (120 vessels including 12 long-liners), but it has no employees locally. This merely reaches 4% of Japanese fishing. Overseas Fishery Cooperation Fund (OFCF) FSM operation manager is Kagoshima University Fishery Department alumnus, but when asked 15 years ago about its business evaluation project, it had developed its use of fishing baits, and an Okinawan fisherman was instructing stick-held dip net fishing. The most important points of the former Japanese reign was working hard together, learning together, and experiencing achievements together. These exchanges including technical instructions are as face-to-face undertakings connecting to nurturing future generation, and also in having this succeeded, promote desirable friendship.

There is a requirement to further the solidification of base for academic exchange and having research partnerships with KORDI branch, college, and enriching museum contents. There is a suitable environmental condition in place for Japanese researchers for the academic endeavour.

References

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